CIT324
Video Display Terminal

User's
Manual

C.ITOH

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USER'S MANUAL

CIT324

VIDEO DISPLAY TERMINAL

C.ITOH

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RELATED DOCUMENTS

CIT324 documentation can be ordered from C. ITOH ELECTRONICS's Field Service Center. Additional Documentation includes:

MANUAL	PART NUMBER
CIT324 Programmer's Manual	300-120
CIT324 Maintenance Manual	300-130

The Programmer's Manual provides information on control codes, control functions, graphic character sets and keyboard generated codes for the CIT324 terminal. The Maintenance Manual provides technical information on maintenance along with complete parts lists, wiring diagrams and schematic diagrams for the CIT324 teminal.

CHAPTER 1

INSTALLATION

UNPACKING

The CIT324 is shipped in two shipping containers, one containing a monitor, a power cord and this user's manual and another containing a keyboard. Unpack the terminal and the keyboard, as shown in the following figure:

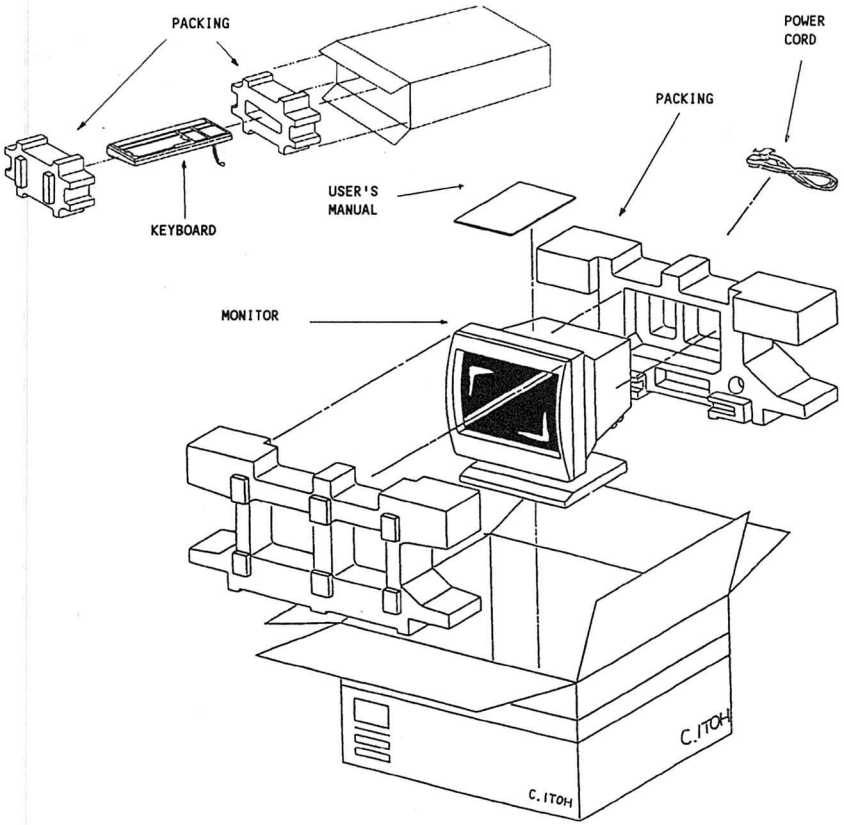

Figure 1-1. Unpacking the CIT324

You should have found the following items:

- a keyboard
- this User's Manual
- a power cord
- the terminal monitor

If any of these items are missing, contact your dealer.

INSPECTION FOR DAMAGE

Carefully inspect each component for any signs of shipping damage. All shipping containers have been specially designed to protect their contents and special care has been taken to prevent damage under normal shipping conditions. Mishandling should be evident upon the inspection of the shipping container. If damage is found after visual inspection, take care not to destroy the evidence. If necessary, document the damage with photographs and contact the transport carrier immediately.

LOCATION

When choosing a location for the CIT324, follow the guidelines listed below:

1. Locate the terminal so that there is free airflow through the top and bottom air vents.
2. Do not place working materials on the air vents.
3. Do not locate the terminal where it can be exposed to direct sunlight or intense heat.
4. Choose a place where the temperature is between 50 and 105° F (10 to 40° C). The relative humidity should be between 5 and 90%.

CONNECTING THE TERMINAL

In order to get the terminal up and running, you will have to connect the keyboard to the monitor unit, plug in the power, and connect the terminal to the host computer. The CIT324 is set to operate on 220-240V at the factory. Follow the procedure as explained in Appendix F when changing the voltage setting.

Keyboard Cable Attachment

Plug the keyboard cable connector into the jack located at the lower right side of the monitor case, as shown in Figure 1-2.

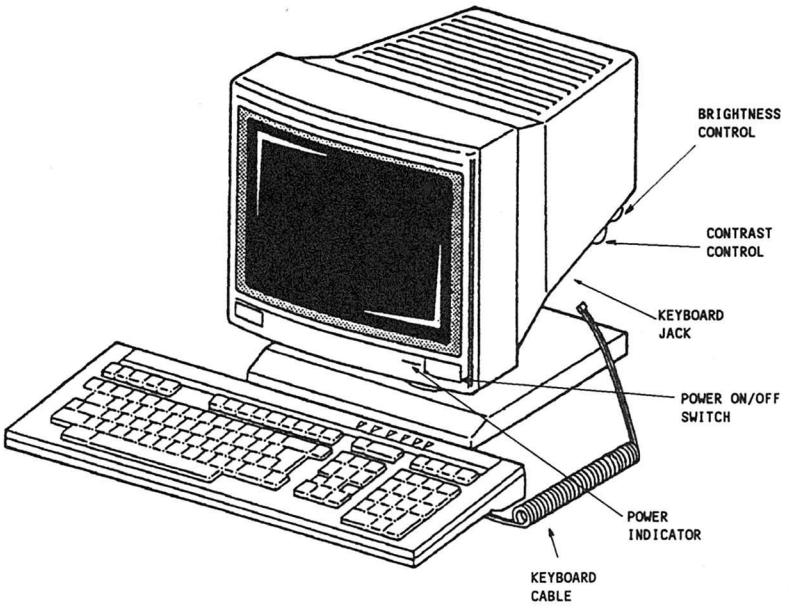

Figure 1-2. CIT324 Video Terminal
(Keyboard Cable Attachment)

AC Line Voltage Connection

BEFORE connecting the power, verify that you have the correct power cord. Four optional power cords are available for use with 220-240V AC power found in European countries and one is for use with 100-120V AC power found in North America. The CIT324 is set to operate on 220-240V at the factory. See Appendix F for changing voltage setting.

The standard power cord used in Europe comes with a standard two prong plug. This plug should be plugged into a properly-grounded two prong receptacle.

If you intend to use any of the optional power cords, make sure that the plug matches the receptacle you intend to use.

The plugs used by these standard and optional power cords are shown in Figure 1-3. For more detailed information on these power cords, refer to Appendix F.

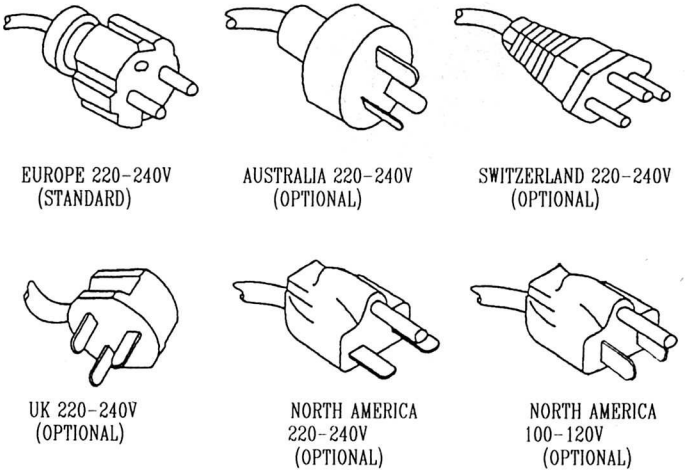

Figure 1-3. Power Cord Plugs

Connect the AC cord to the receptacle at the rear of the video terminal (shown in Figure 1-4). Plug the cord into the correct AC outlet.

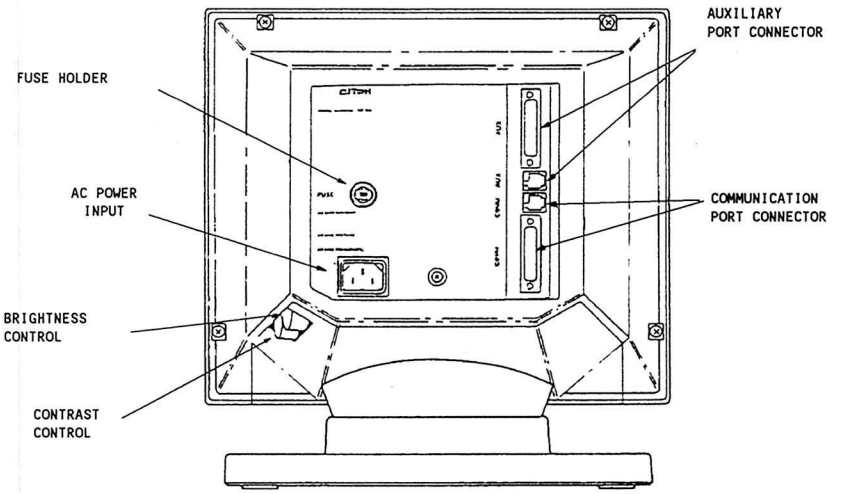

Figure 1-4. The CIT324 Back Panel

Connecting to the Computer

In most cases, the port labelled COMM is used to connect the CIT324 to the host computer.

To connect the terminal, plug the cable connector into the connector marked "COMM" on the back of the terminal, as shown in Figure 1-4. Secure the connector with the lock screws (if provided).

Connecting to a Printer

To connect the terminal to a printer, plug the cable connector into the connector marked "AUX" on the back of the terminal, as shown in Figure 1-4. Secure the connector with the lock screws (if provided). Plug the other end of the cable into the printer's interface connector, and secure it with lock screws.

> DO NOT USE AUX D-SUB CONNECTOR AND AUX MMJ CONNECTOR SIMULTANEOUSLY.

TERMINAL CHECKOUT

Press the power ON/OFF switch located on the front of the terminal, as shown in Figure 1-2. The terminal responds with a beep tone and performs a self-test.

When the test is successfully completed, the message "CIT324 OK" appears on the screen and the terminal is ready for the Terminal Set-Up procedures. When a character is received from the host computer, the message is removed. Or, to remove the message, press any key on the keyboard.

CARE AND MAINTENANCE

With the exception of occasional dusting or cleaning, the CIT324 should require very little care and maintenance. When required, the terminal should be cleaned with a dry, lint-free cloth. If the CRT screen or the plastic case need cleaning, remove the AC power cord first to prevent any accidents. Clean the terminal with a cloth dampened with a mild detergent solution. Avoid the use of strong solvent cleaners or detergents which may damage plastic surfaces.

CHAPTER 2

OPERATION

INTRODUCTION

The CIT324 is a versatile, low cost, multi-functional video display terminal with a 108-key detachable keyboard. The terminal allows the user to communicate with a host computer system via the keyboard and display screen. The CIT324 can be interfaced with a variety of computer systems and peripheral devices.

The CIT324 operates in either an ANSI mode or a VT52 mode. In the ANSI mode the terminal uses American National Standard Institute (ANSI) programming standards and is compatible with the DEC VT320, VT220 and VT100, and C. ITOH ELECTRONICS CIT101e, CIT101, CIT220+, CIT224 and CIT224+ video terminals. In the VT52 mode, the CIT324 is compatible with DEC VT52 terminals.

COMPONENTS AND CONTROLS

As shown in Figure 1-2, the terminal consists of a monitor unit with a tilt and swivel base and a separate, detachable keyboard. The locations of the ON/OFF switch, contrast control, and brightness control are shown in Figure 1-2.

ADJUSTING THE TERMINAL

The simplest adjustments, such as display brightness and contrast, can be made by using the monitor controls shown in Figure 1-2. If you wish to make other changes (such as turning off the keyclick and changing the smooth scroll rate), you must use the Set-Up mode. Below is a brief explanation of how to use the Set-Up mode to make the most common adjustments. For a complete explanation of the Set-Up mode, refer to Chapter 4.

Any changes made in the Set-Up mode should be saved permanently. Otherwise, turning the terminal off and on will erase the changes. To do so, perform the following steps after you have made your changes:

If you exited the Set-Up mode, press the SET-UP to re-enter it. Otherwise, press the F6 key to return to the main menu.

Press the down arrow (↓) key until the "Save Parameters" field is highlighted, and then press the ENTER key. The word "Done" will appear in the Set-Up mode status line.

Press the SET-UP key to exit the Set-Up mode.

Viewing Angle

To adjust the viewing angle, firmly grasp the display on both sides. Tilt and swivel the monitor until it is at the most comfortable viewing angle.

Brightness and Contrast

As shown in Figure 1-2, the contrast and brightness controls are located on the right side of the terminal. The contrast control is mounted forward of the brightness control.

To adjust the display brightness and contrast, turn the contrast knob until the contrast is correct. Then use the brightness knob to adjust the brightness.

In most cases, the contrast should be set to its maximum. After this has been done, fine tune the display by turning the brightness knob until the brightness is correct.

Selecting Reverse Video

To change the screen from normal video (light characters on a dark background) to reverse video (dark characters on a light background), perform the following steps:

If you have not done so yet, enter the Set-Up mode by pressing the SET-UP key.

Press the F8 key if you are not at the Display Set-Up Menu yet.

Repeatedly press the down arrow (↓) key until the "Text Display: Light Text on Dark" field is highlighted.

Press the ENTER key until the correct selection appears.

Changing the Scrolling Rate

The scrolling rate is controlled by several parameters. These parameters include the scroll type (smooth or jump), the smooth scroll increment (1 or 2 scan lines at a time), and the smooth scroll rate (from 1 to 9, with 1 = fast and 9 = slow).

To change the scrolling type, perform the following steps:

If you have not done so yet, enter the Set-Up mode by pressing SET-UP key.

If you are not at the Display Set-Up Menu yet, press F8 key.

Press the up arrow (↑) or down arrow (↓) key until the "Scroll Type" field is highlighted.

Press the ENTER key to change the scrolling type.

To change the smooth scroll rate:

Press the SET-UP key if you are not in the Set-Up mode yet.

Press the F8 key if you are not at the Display Enhancements Menu yet.

Press the up arrow (↑) or down arrow (↓) key until the "Smooth Scroll Increment" field is highlighted.

Press the ENTER key to change the scroll increment. Selecting 2 scan lines will increase the smooth scroll speed.

Press the down arrow (↓) key until the "Smooth Scroll Rate" field is highlighted.

Press the ENTER key to change the scroll rate. 1 is the fastest and 9 is the slowest.

Changing the Keyboard Auto Repeat Setting

To turn the keyboard auto repeat off or on, perform the following steps:

Press the SET-UP key if you are not in the Set-Up mode yet.

Press the F9 key if you are not at the Keyboard Set-Up Menu.

Press the down arrow (↓) key until the "Auto Repeat" field is highlighted.

Press the ENTER key to turn the auto repeat off or on.

To change the auto repeat speed, perform the following steps:

Press the SET-UP key if you are not in the Set-Up mode yet.

Press the F9 key if you are not at the Keyboard Set-Up Menu.

Press the down arrow (↓) key until the "Auto Repeat Rate" field is highlighted.

Press the ENTER key to change the auto repeat speed.

Turning the Keyclick Off/On

To turn the keyclick (the electronic click which sounds when a key is pressed) off or on, perform the following steps:

Press the SET-UP key if you are not in the Set-Up mode yet.

Press the F9 key if you are not at the Keyboard Set-Up Menu yet.

Press the down arrow (↓) key until the "Key Click" field is highlighted.

Press the ENTER key to turn the auto repeat off or on.

Turning the Margin Bell Off/On

By default, the terminal beeps whenever the cursor is eight columns from the right margin. To turn this margin bell off or on, perform the following steps:

Press the SET-UP key if you are not in the Set-Up mode yet.

Press the F9 key if you are not at the Keyboard Set-Up Menu yet.

Press the ENTER key.

Press the down arrow (↓) key until the "Margin Bell" field is highlighted.

Press the ENTER key to turn the margin bell off or on.

EMULATION MODES

The CIT324 has the following four emulation modes:

VT300, 7-Bit Mode
VT300, 8-Bit Mode
VT100 Mode
VT52 Mode

These modes determine the way the terminal responds to commands. Below is a brief explanation of each mode. For an explanation on how to select these modes, refer to the Terminal Set-Up Menu explanation in Chapter 4.

VT300, 7-Bit Mode

This mode provides full use of the CIT324's features and conforms to the standard ANSI command format. It sends 7-bit control codes and characters, and accepts both 7- and 8-bit control codes if 8-bit parity is enabled in the Communications Set-Up Menu. All of the character sets of the terminal are supported in this mode.

The VT300, 7-Bit mode accepts most VT100 programs, and is the default mode of the CIT324.

VT300, 8-Bit Mode

This mode provides full use of the CIT324 features and conforms to the standard ANSI command format. It sends 8-bit control codes and characters, and accepts both 7- and 8-bit control codes if 8-bit parity is enabled in the Communications Set-Up Menu. All of the character sets of the terminal are supported in this mode.

VT100 Mode

This mode conforms to the standard ANSI command format. When the CIT324 is used with application programs requiring strict compliance to DEC VT100 terminals, this mode should be enabled. Only 7-bit control codes are executed. ASCII, Special Graphics and NRC sets are supported in this mode.

VT52 Mode

This mode executes non-ANSI DEC private functions, and restricts programs to existing VT52 application programs.

CHAPTER 3

KEYBOARDS

The CIT324 keyboard consists of main and numeric keypad, along with such VT320-compatible features as an editing keypad and programmable function keys.

KEYBOARD DESCRIPTION

Functionally, there are four types of keys and two types of indicators on the CIT324 keyboard (shown in Figure 3-1). The basic types include:

1. Standard typewriter keys
2. Editing keypad with cursor control keys
3. A calculator-type numeric keypad with special function control keys
4. Terminal control and function keys (Programmable Keys)
5. Six LED status indicators
6. Two audible indicators: a keyclick and a bell tone

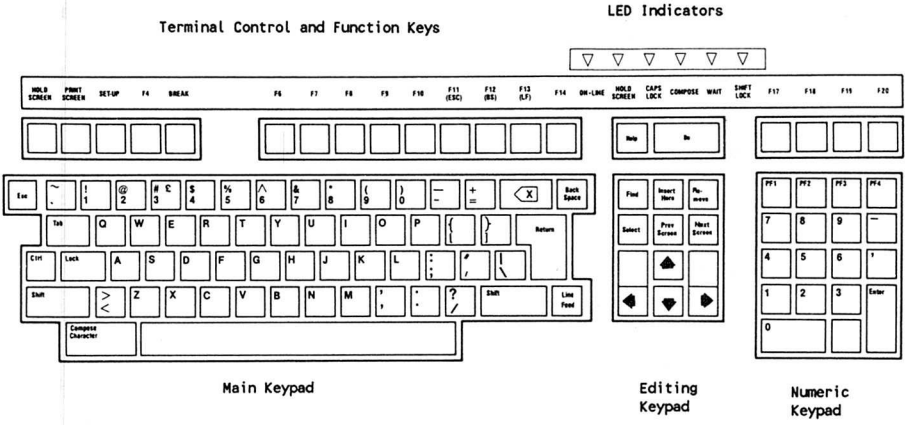

Figure 3-1. CIT324 Keyboard

MAIN KEYPAD KEYS

The main keypad includes both standard alpha-numeric/symbol keys and control keys, as shown below:

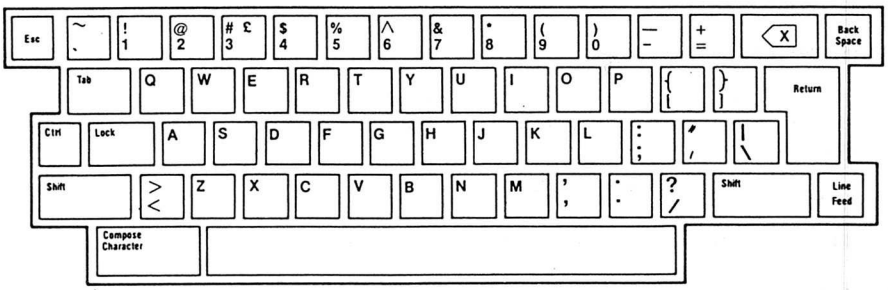

Figure 3-2. Main Keypad

Standard Keys

In conjunction with the SHIFT and/or LOCK keys, the standard keys can be used to enter all of the uppercase and lowercase letters, numerals, and symbols found in a standard typewriter layout.

Special Characters

The characters that can be entered by the CIT324's keyboard are not limited to the standard (US ASCII) characters found on a normal typewriter keyboard. Special characters can be entered by selecting a non-English keyboard layout and/or by using the Compose Character mode.

National and Multinational Characters

The COMPOSE CHARACTER key can be used to enter special international characters, such as characters with accents or umlauts. The range of the characters which can be entered using the COMPOSE CHARACTER key depends upon the National/Multinational character set, emulation mode, and keyboard layout selection.

The Multinational character set is available only in the VT300 emulation modes (as selected in the Terminal Set-Up Menu). When the Multinational character set is selected, the COMPOSE CHARACTER key can be used with any keyboard layout to enter a complete set of international characters.

The National character sets are available in any emulation mode -- but only when a non-English keyboard layout has been selected. When the National character sets are selected, the COMPOSE CHARACTER key can be used to enter a more restricted range of nation-specific characters.

For more information about the COMPOSE CHARACTER key, refer to the Compose Character Sequences section later in this chapter.

National Keyboard Layout

The CIT324's fifteen national keyboard layouts provide access to international characters without requiring you to use the Compose Character mode's two- and three-character sequences. These keyboard layouts are shown at the end of this chapter, while the set-up selections for these keyboards are explained in Chapter 4.

Data Processing and Typewriter Keys

When any non-English keyboard layout is selected, some of keys can be used to enter more than one set of characters. These keys have more than two characters on their keypads, as shown in the keyboard layout illustrations at the end of this chapter. The "Keyboard" field in the Keyboard Set-Up Menu determines which of these characters can be entered. If the keyboard type is set to "Typewriter", the characters shown on the left side of the keycap can be entered. If the keyboard type is set to "Data Processing", the characters shown on the left side of the keycap can be entered.

Main Keypad Control Keys

The main keypad control keys are described below.

> The <x] (DELETE) key erases one character to the left of the cursor. Pressing <CTRL-<x]> generates a CAN (Cancel) control character.

BACK SPACE — This key moves the cursor one position to the left -- until the cursor reaches the first column of the current line.

COMPOSE CHARACTER — Starts a compose sequence which is used to generate characters that do not exist on the standard keypad. For more information, refer to the Compose Character Sequences section later in this chapter.

CTRL — This key is used with other keys to generate special control codes.

ESC — Generates an ESC code which introduces a sequence of key actions that constitute an escape command.

LINE FEED — Transmits a Line Feed character to the host computer. When in the Line Feed mode, the LINE FEED key causes the cursor to move down one line while maintaining its current column position. When in the New Line mode, the LINE FEED key causes the cursor to advance to the first position on the next line.

LOCK — To use the LOCK key to enter uppercase characters, press the LOCK key once. The CAPS LOCK LED will be lit and the Caps Lock or Shift Lock mode will be turned on (depending upon the parameter selected for the "Lock Key" field in the Keyboard Set-Up Menu). To return to normal keyboard operation, press the LOCK key a second time.

When the terminal is in the Caps Lock mode, pressing any letter key will cause the shifted (uppercase) version of that letter to be produced.

Note that the Caps Lock mode only affects the letter keys on the main keypad. Pressing any number, symbol, or punctuation mark key will cause the unshifted (normal) character to be produced.

When the terminal is in the Shift Lock mode, pressing any alphanumeric, symbol, or punctuation mark key on the main keypad will cause the shifted character to be produced.

RETURN — Transmits either a Carriage Return (CR) character or an LF and a CR character, depending on the set/reset state of Carriage Return/New Line mode. Pressing RETURN moves the cursor to the first position on current cursor line when editing text, or the return will be converted to a Carriage Return /Line Feed sequence which will position the cursor to first column of the next sequential line. This function will cause a destractive scroll to occur if executed on line 24.

SHIFT — Does not transmit a code. This key is used with other keys to generate special function codes or uppercase letters and symbols.

SPACE BAR — Transmits a SPACE character and advances the cursor one position to the right.

TAB — Transmits an HT character. The TAB key moves the cursor to the next tab stop. When used with the SHIFT key, it generates a BACKTAB.

EDITING KEYPAD

As shown in Figure 3-3, the editing keypad includes both cursor control keys and special editing keys.

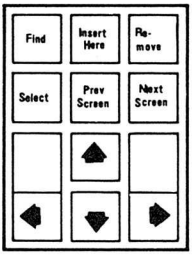

Figure 3-3. Editing Keypad

The cursor control keys (the right, left, up, and down arrow keys) move the cursor right, left, up or down, -- usually under host computer control. In the Set-Up mode, the keys allow you to select Set-Up mode parameters for alteration.

In the VT100 or VT52 emulation modes, only the cursor control keys will work. The editing keys (FIND, INSERT HERE, REMOVE, SELECT, PREV SCREEN, and NEXT SCREEN) are inoperable in VT100 or VT52 modes.

Under host computer control, the editing keys allow you to find specific characters, insert and/or remove data, and advance and/or backup to the next or previous screens.

NUMERIC KEYPAD

The numeric keypad adds versatility and convenience to the CIT324. The keypad permits single key entry of various special control sequences and direct input of decimal or hexadecimal data.

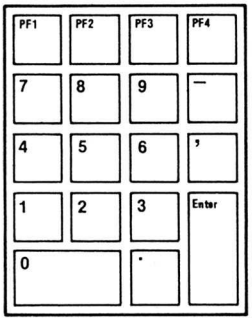

Figure 3-4. Numeric Keypad

The keypad can operate in one of three modes, decimal numeric, hexadecimal numeric, or application. These modes can be selected in the Keyboard Set-Up Menus (as explained in Chapter 4), or by software control (as explained in the Programmer's Manual).

Keypad Numeric Mode

The keypad enters the numeric mode whenever the terminal is powered-up or reset. In this mode, the numeric and punctuation keys function the same as the corresponding keys on the main keypad. The ENTER key performs the same function as the RETURN key when the edit mode is not on. As with the RETURN key, the action of the ENTER key is affected by the New Line mode. When the New Line mode is off, pressing the ENTER key will generate a carriage return only. When the New Line mode is on, pressing the ENTER key will generate a carriage return and line feed.

The four special function keys (PF1, PF2, PF3, and PF4) generate control sequences, as shown in Appendix B. When pressed in combination with the CTRL and/or SHIFT keys, the PF1 through PF4 keys can be used to control the CIT324's printer port. Refer to the subsequent Printer Port Control section.

The keypad can also be set to work as a hexadecimal keypad. When the "Numeric Keypad" field in the Keyboard Enhancements Menu is set to hexadecimal, the function of the PF1, PF2, PF3, P4, minus, and comma keys will be changed so that they generate the A through F characters, respectively.

Keypad Application Mode

When set to the keypad application mode, the numeric keypad generates special control sequences. Appendix B lists these sequences.

FUNCTION KEYS

Across the top of the CIT324 keyboard is a row of function keys, as shown in Figure 3-5. These are used for set-up, applications, and control of terminal functions. There are 20 function keys, F1 through F20. Keys F1 through F5 (HOLD SCREEN, PRINT SCREEN, SET-UP, F4, and BREAK) perform terminal control functions and do not transmit codes.

Keys F6 through F20 are used to generate special control sequences. By using the Programmable Key Editor or software control sequences, the F6 through F20 keys can be redefined to generate up to 45 control or text sequences. For more information on how to program function keys from the keyboard, refer to the Programmable Key Editor section in Chapter 4.

Note that in the default state of the VT100 and VT52 emulation modes, all but three of the F6 to F20 function keys are disabled. Only the F11, F12, and F13 keys perform any function. The F11 key generates an Escape code, while the F12 and F13 keys generate a Backspace and a Line Feed, respectively. If the "F6-F20 VT100" field in the Keyboard Enhancements Menu is set to "Programmable", the F6-F20 keys will generate VT300-type control sequences.

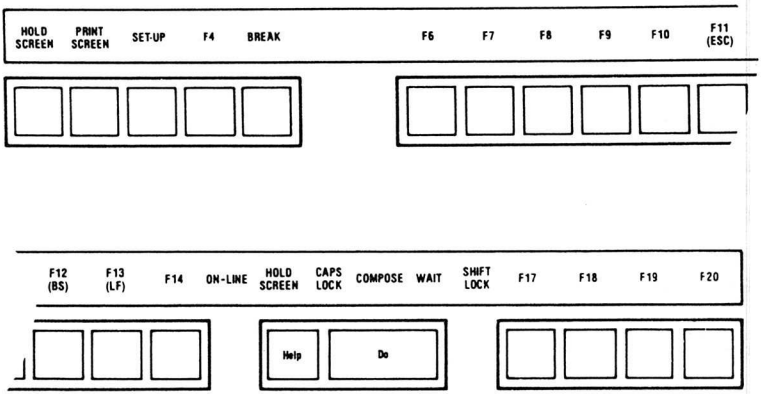

Figure 3-5. Function Keys

A description of the actions of the terminal control and function keys as follows.

HOLD SCREEN	Halts transmission of data to the screen. To unlock the screen, press the key a second time. The HOLD SCREEN key will not work if the "Protocol" field in the Communications Set-Up Menu is set to "No Xoff".
PRINT SCREEN	Initiates a printout of the screen display as defined by the Print Area field selection in the Auxiliary Enhancements Menu. When pressed with the CTRL key, it sets or resets the Auto Print Mode.
SET-UP	Toggles the Set-Up mode. Press once to enter the Set-Up mode, press again to return to the previous screen display.
F4	This key is disabled.
BREAK	Transmits a break signal if break is turned on in the Keyboard Set-Up Menu. When pressed with the SHIFT key it performs a disconnect. When pressed with the CTRL key it sends the answerback message to the host.

F6-F10 These keys are defined by application programs. They can also be programmed by control sequences (see Appendix D) or the Programmable Key Editor (as explained in Chapter 4).

F11 (ESC) The F11 key can be defined by application programs, or programmed via control sequences or the Programmable Key Editor. In the VT100 and VT52 emulation modes, the F11 key transmits an ESC character.

F12 (BS) The F12 key is defined by application programs, programmed via control sequences or the Programmable Key Editor, or transmits a back space (BS) character in the VT100 and VT52 emulation modes.

F13 (LF) The F13 key is defined by application programs, programmed via control sequences or the Programmable Key Editor, or transmits a line feed (LF) character in the VT100 and VT52 emulation modes.

F14 - F20 These keys are defined by application programs, or programmed via control sequences or the Programmable Key Editor.

LED INDICATORS

The CIT324 has the following six LED indicators. These indicators provide status information on the terminal operations.

HOLD SCREEN Indicates that the display screen is on hold, or locked.

WAIT Indicates that the keyboard is locked and cannot transmit information. To unlock the keyboard, enable the "Clear Comms Buffer" feature in the Set-Up menu.

COMPOSE Indicates that a "compose sequence" is being performed. (Refer to the Compose Character Sequences section in this chapter.)

ON-LINE Indicates that the terminal is in the on-line state and ready to communicate with the host computer.

SHIFT LOCK Indicates that the terminal is in the Shift-Lock mode.

CAPS LOCK Indicates that the terminal is in the Caps-Lock mode.

AUDIBLE INDICATORS

The keyboard provides two types of audible indicators, a keyclick and a bell tone. The Keyboard Set-Up Menu controls these indicators, as explained in Chapter 2.

Keyclick — A keyclick sounds when you press any key except the SHIFT and CTRL keys, or when the keyboard is locked and the WAIT indicator is on.

Bell — The terminal sounds a bell tone (or beep) when the cursor approaches the right margin, except when in the insert mode. It also sounds when an error is made during a compose sequence, when the host sends a BEL character to the terminal, or during the power-up self-test.

KEYBOARD AUTO REPEAT

A key pressed for more than 0.5 seconds automatically repeats when the Auto Repeat Mode is selected. Auto repeat can be enabled or disabled through the Keyboard Set-Up menu or by using the control sequences. Note that the following keys do not auto repeat:

HOLD SCREEN	COMPOSE CHARACTER
PRINT SCREEN	SHIFT
SET-UP	RETURN
F4	LOCK
BREAK	CTRL

The rate of auto repeat is set through the Keyboard Enhancements Menu. Auto repeat can be set to slow (about 14 characters per second) or fast (about 21 characters per second).

PRINTER PORT CONTROL

Depending upon which function is selected, you can use AUX port as a printer port or as an alternate communication port, or even redirect data received at the AUX port to the COMM port. To select these functions, press and hold the SHIFT key and/or the CTRL key, and then press one of the printer function keys (PF1 through PF4) on the numeric keypad. The printer functions available and the keystrokes which select them are explained below:

<SHIFT> <PF1> LINE SEND -- Transfers the current display line occupied by the cursor to the auxiliary port. This functions in the on-line or local mode.

<CTRL> <PF1> PAGE SEND -- Transfers the entire contents of the display to the auxiliary port. If the origin mode is set only the active portion of the display is output. This function operates in the on-line or local mode.

<SHIFT> <PF2> KEYBOARD TO AUXILIARY MODE -- Directs keyboard data exclusively to the auxiliary port and disables the SHIFT PF3 function.

<CTRL> <PF2> AUTO AUXILIARY MODE -- Transfers the current display line occupied by the cursor to the auxiliary port whenever a line feed code is received from any port input line or the keyboard.

<SHIFT> <PF3> KEYBOARD TO COMMUNICATION MODE -- Directs keyboard data exclusively to the communication port and disables the SHIFT PF2 function.

<CTRL> <PF3> AUXILIARY CONTROL MODE -- Directs data received on any I/O port exclusively to the auxiliary port. Data is not displayed on the screen.

<SHIFT> <PF4> AUXILIARY OUTPUT DISABLE -- Disables all modes directing data to the auxiliary port, except the SHIFT PF2 function.

<CTRL> <PF4> CONCURRENT AUXILIARY MODE -- Directs data at any port to the display and auxiliary port.

<SHIFT> <CTRL> <PF2> AUXILIARY TO COMMUNICATION MODE -- Directs data input at auxiliary port to be output at the communications port. This function can be performed concurrently with the SHIFT CTRL PF3 function.

<SHIFT> <CTRL> <PF3> AUXILIARY TO DISPLAY MODE -- Directs data from the auxiliary port to the display. This function can be performed concurrently with the SHIFT CTRL PF2 function.

<SHIFT> <CTRL> <PF4> AUXILIARY INPUT DISABLE -- Disables SHIFT CTRL PF2 and SHIFT CTRL PF3 functions.

KEYBOARD GENERATED CONTROL CODES

The alphanumeric keys on the standard keypad can also be used to enter normally invisible control characters. To do so, you must press and hold the CTRL key, and then press an alphanumeric key, as shown in the following table.

Some of these key sequences (such as <CTRL> <I>/Tab) merely duplicate functions already performed by the main keypad control keys. Others generate control codes which can be used to program the terminal or access special system functions (such as <CTRL> <Y>, <CTRL> <Z>, <CTRL> <C>, and <CTRL> <T>).

Key Sequence	Control Code
<CTRL> <2> or <CTRL> <SPACE BAR>	NUL
<CTRL> <A>	SOH
<CTRL> <B>	STX
<CTRL> <C>	ETX
<CTRL> <D>	EOT
<CTRL> <E>	ENQ
<CTRL> <F>	ACK
<CTRL> <G>	BEL
<CTRL> <H>	BS (Back Space)
<CTRL> <I>	HT (Horizontal Tab)
<CTRL> <J>	LF (Line Feed)
<CTRL> <K>	VT
<CTRL> <L>	FF
<CTRL> <M>	CR (Carriage Return)
<CTRL> <N>	SO
<CTRL> <O>	SI
<CTRL> <P>	DLE
<CTRL> <Q>	DC1 (XON/Hold Screen Off)
<CTRL> <R>	DC2
<CTRL> <S>	DC3 (XOFF/Hold Screen On)
<CTRL> <T>	DC4
<CTRL> <U>	NAK
<CTRL> <V>	SYN
<CTRL> <W>	ETB
<CTRL> <X>	CAN
<CTRL> <Y>	EM
<CTRL> <Z>	SUB
<CTRL> <[>	ESC
<CTRL> <3>	ESC
<CTRL> <\>	FS
<CTRL> <4>	FS
<CTRL> <]>	GS
<CTRL> <5>	GS

Key Sequence	Control Code
<CTRL> <~>	RS
<CTRL> <6>	RS
<CTRL> <?>	US
<CTRL> <7>	US
<CTRL> <8>	DEL (Delete)

CONDITIONS THAT CAUSE KEYBOARD LOCK

If the host computer sends a command to lock the keyboard, or if the keyboard's output buffer becomes full, the WAIT indicator lights up, keyclick is disabled, and the keyboard locks up. All keys, except F1 through F5, are disabled.

The keyboard's unlocks when one of the following occurs:

- The keyboard's output buffer begins to empty (provided that the keyboard lock command (CSI 2 h) has not been sent from the host)
- The host sends a command to unlock the keyboard (CSI 2 1)
- Entering Set-Up Mode and selecting the "Clear Comms Buffer", "Reset Terminal", "Recall Parameters", or "Default Parameters" fields in the Main Set-Up Menu.
- Performing a hard terminal reset. A hard terminal reset can be performed by turning the terminal off and on, or by issuing the hard terminal reset command (ESC c).

COMPOSE CHARACTER SEQUENCES

The CIT324 provides a compose character function to create characters that are not available on the keyboard. These characters are created through either two-key or a three-key compose character sequences.

Three-key sequences allow you to generate the widest range of characters. Three-key sequences can be used with all keyboard layouts in 8-bit multinational and 7-bit national codes.

Although two-key compose sequences are faster than the three-key sequences, the range of characters which you can generate using two-key sequences is limited. Two-key sequences cannot be used with the North American Keyboard layout.

Compose sequences are divided between the Multinational mode sequences and the National mode sequences. The type of compose sequences available depends upon whether the Multinational or National character sets are selected in the Display Enhancements Menu.

Entering Three-Key Compose Sequences

To enter a three-key compose character sequence, perform the following steps:

. Press the COMPOSE CHARACTER key. The COMPOSE LED indicator on the keyboard lights up.

. Enter the two characters required to create the desired supplemental character, as shown in Table 3-1 or Table 3-2.

. The supplemental character is generated and the COMPOSE LED indicator is turned off.

Most compose sequences are not order sensitive, unless otherwise noted in the table.

For example, to create an 'a' with a circumflex accent, press the COMPOSE CHARACTER key, enter 'a' and the circumflex character (^). Since this compose sequence is not order sensitive, it can also be entered as follows: <COMPOSE CHARACTER>, <^>, <a>.

If an invalid sequence is entered, the bell sounds (if the warning bell has been enabled in the Terminal Set-Up Menu) and the sequence is aborted.

Entering Two-Key Compose Sequences

To enter two-key compose character sequences, perform the following steps:

. Press one of the following diacritical marks:

grave accent (`)
circumflex accent (^)
acute accent (´)
tilde mark (~)
dieresis mark (umlaut) (¨)

. The COMPOSE LED indicator on the keyboard lights up.

. Enter the character required to create the desired supplemental character, as shown in Table 3-1 or Table 3-2.

. The supplemental character is generated and the COMPOSE LED indicator turns off.

For example, to create an 'a' with a circumflex accent, press the key that has the circumflex accent (^) and then enter the 'a'. Because all two-key compose sequences are order sensitive, it is necessary to enter the diacritical mark before the character.

If an invalid sequence is entered, the bell sounds (if the warning bell has been enabled in the Terminal Set-Up menu) and the sequence is aborted.

Aborting or Restarting a Compose Sequence

If the compose mode is entered accidentally, it can be aborted by pressing <x] (DELETE) key. Pressing any of the following keys during a compose sequence will cancel the sequence and perform their usual function.

TAB	Any top row key (F1-F20)
RETURN	Period key on the numeric keypad
ENTER	Any CTRL Key combination

If a mistake is made during a compose sequence, you may restart that sequence, or begin a new one, by pressing the COMPOSE CHARACTER key again. The original entry is aborted and the new entry is executed.

Multinational Mode Compose Sequences

The Multinational mode compose sequences are available if the Multinational character set is selected in the Display Enhancements Menu, as detailed in the set-up mode explanation in Chapter 4.

Note that the widest range of Multinational mode compose sequences is available in either of the VT300 emulation modes. If the VT100 or VT52 emulation mode is selected (in the Terminal Set-Up Menu), the compose sequences will be restricted to the characters normally available with the currently-selected keyboard layout.

Table 3-1. Multinational Compose Sequences

CHARACTER		THREE-KEY SEQUENCE	TWO-KEY SEQUENCE
"	Quotation Mark	"(sp) or (sp)"	"(sp)
#	Number Sign	++	
'	Apostrophe	'(sp)	'(sp)
@	Commercial at	aa or AA or Aa or aA	
[	Opening Bracket	((	
\	Backslash	// or /< or </	
]	Closing Bracket	))	
^	Circumflex	^(sp) or (sp)^	^(sp)
'	Single Quote	`(sp) or (sp)`	`(sp)
{	Opening Brace	(- or -(	
|	Vertical Line	/^ or ^/	
}	Closing Brace	)- or -)	
~	Tilde	~(so) or (sp)~	~(sp)
¡	Inverted !	!!	
¢	Cent Sign	c/ or C/ or c| or C| or /C or /c or |C or |c	
£	Pound Sign	l- or L- or l= or L= or -l or -L or =l or =L	
¥	Yen Sign	y- or Y- or y= or Y= or -Y or -y or =y or =Y	
§	Section Sign	s! or S! or so or So or sO or SO or s0 or S0 !s or !S or os or oS or 0s or 0S or 0s or 0S	
¤	Currency Sign	xo or XO or x0 or X0 or ox or OX or 0x or 0X or Xo or oX or xo or ox	
©	Copyright Sign	co or CO or c0 or C0 or oc or OC or 0c or 0C or Co or oC or co or oc	
ª	Feminine Ordinal Indicator	a_ or A_ or _a or _A	
«	Angle Quotation Mark Left	<<	
°	Degree Sign	0^ or (sp)* or ^0 or *(sp)	
±	Plus/Minus Sign	+- or -+	
⁰	Superscript 0	0^	
¹	Superscript 1	1^ or ^1	
²	Superscript 2	2^ or ^2	
³	Superscript 3	3^ or ^3	
µ	Micro Sign	/u or /U (order sensitive)	
¶	Paragraph Sign	p! or P! or !p or !P	
·	Middle Dot	.^ or ^.	
º	Masculine Ordinal Indicator	o_ or O_ or _o or _O	

Table 3-1. Multinational Compose Sequences (Cont.)

CHARACTER		THREE-KEY SEQUENCE	TWO-KEY SEQUENCE
»	Angle Quotation Mark Right	>>	
¼	Fraction one-quarter	14 (order sensitive)	
½	Fraction one-half	12 (order sensitive)	
¿	Inverted ?	??	
À	A grave	A` or `A	`A
Á	A acute	A' or 'A	'A
Â	A circumflex	A^ or ^A	^A
Ã	A tilde	A~ or ~A	~A
Ä	A umlaut	A" or "A	"A
Å	Quotation Mark	A* or *A	*A
Æ	AE ligature	AE (order sensitive)	
Ç	C cedilla	C, or ,C	
È	E grave	E` or `E	`E
É	E acute	E' or 'E	'E
Ê	E circumflex	E^ or ^E	^E
Ë	E umlaut	E" or "E	"E
Ì	I grave	I` or `I	`I
Í	I acute	I' or 'I	'I
Î	I circumflex	I^ or ^I	^I
Ï	I umlaut	I" or "I	"I
Ñ	N tilde	N~ or ~N	~N
Ò	O grave	O` or `O	`O
Ó	O acute	O' or 'O	'O
Ô	O circumflex	O^ or ^O	^O
Õ	O tilde	O~ or ~O	~O
Ö	O umlaut	O" or "O	"O
Œ	OE ligature	OE (order sensitive)	
Ø	O slash	O/ or /O	
Ù	U grave	U` or `U	`U
Ú	U acute	U' or 'U	'U
Û	U circumflex	U^ or ^U	^U
Ü	U umlaut	U" or "U	"U
Ý	Y umlaut	Y" or "Y	"Y
ß	German small sharps	ss	
à	a grave	a` or `a	`a
á	a acute	a' or 'a	'a
â	a circumflex	a^ or ^a	^a
ã	a tilde	a~ or ~a	~a
ä	a umlaut	a" or "a	"a
å	a ring	a* or *a	
æ	ae ligature	ae (order sensitive)	
ç	c cedilla	c, or ,c	
è	e grave	e` or `e	`e
é	e acute	e' or 'e	'e
ê	e circumflex	e^ or ^e	^e

Table 3-1. Multinational Compose Sequences (Cont.)

CHARACTER		THREE-KEY SEQUENCE	TWO-KEY SEQUENCE
ë	e umlaut	e¨ or ¨e	¨e
ì	i grave	i` or `i	`i
í	i acute	i´ or ´i	´i
î	i circumflex	i^ or ^i	^i
ï	i umlaut	i¨ or ¨i	¨i
ñ	n tilde	n~ or ~n	~n
ò	o grave	o` or `o	`o
ó	o acute	o´ or ´o	´o
ô	o circumflex	o^ or ^o	^o
õ	o tilde	o~ or ~o	~o
ö	o umlaut	o¨ or ¨o	¨o
œ	oe ligature	oe (order sensitive)	
ù	u grave	u` or `u	`u
ú	u acute	u´ or ´u	´u
û	u circumflex	u^ or ^u	^u
ü	u umlaut	u¨ or ¨u	¨u
ý	y umlaut	y¨ or ¨y	¨y

Table 3-1. Multinational Compose Sequences (Cont.)
(ISO Latin-1)

CHARACTER		THREE-KEY SEQUENCE	TWO-KEY SEQUENCE
	no break space	sp sp	
¦	Broken vertical bar	|| or !^ or ^!	
¬	Logical not	-,	
-	Soft(syllable)hyphen	--	
®	Registered trademark	RO or OR or rO or Or or Ro or oR or ro or or	
¯	Macron	-^ or ^-	
¾	Fraction three -quarters	34 (order sensitive)	
÷	Division sign	-: or :-	
x	Multiplication sign	xx	
´	acute accent	´	
Ç	cedilla	,,	
¨	diaeresis	""	¨sp
Ý	Y acute	Y´ or ´Y	´Y
ý	y acute	y´ or ´y	
þ	Capital Icelandic thorn	TH	
Þ	Small Icelandic thorn	th	
Ð	Capital Icelandic Eth	-D or D-	
ð	Small Icelandic Eth	-d or d-	

National Mode Compose Sequences

National mode compose sequences can only be used if the National character set is selected in the Display Enhancements Menu. The actual sequences available vary according to the Keyboard Layout selection in the Keyboard Set-Up Menu. Because the National character set cannot be used with the North American keyboard layout, National mode compose sequences will not be available when the North American keyboard layout is selected.

Table 3-2. National Mode Compose Sequences

CHARACTER		THREE-KEY SEQUENCES	TWO-KEY SEQUENCES
British Keyboard			
£	Pound Sign	l- or L- or l= or L= or -l or -L or =l or =L	
\	Backslash	/< or </	
'	Single Quote	`(sp) or (sp)`	
"	Quotation Mark	"(sp) or (sp)"	
'	Apostrophe	'(sp) or (sp)'	
[	Opening Bracket	((	
]	Closing Bracket	))	
{	Opening Brace	(- or -(	
}	Closing Brace	)- or -)	
|	Vertical Line	^/ or /^	
~	Tilde	~(sp) or(sp)~	
@	Commercial at	aa or AA or aA or Aa	
Flemish Keyboard			
£	Pound sign	l- or L- or l= or L= or -l or -L or =l or =L	
§	Section	s! or S! or so or So or sO or SO or s0 or S0 or !s or !S or os or oS or 0s or 0S or 0s or 0S	
'	Apostrophe	'(sp) or (sp)'	
'	Single Quote	`(sp) or (sp)`	
"	Quotation Mark	"(sp) or (sp)"	
à	a grave	a` or `a	`a
è	e grave	e` or `e	`e
ù	u grave	u` or `u	`u
ç	c cedilla	c, or ,c	
French Canadian Keyboard			
'	Apostrophe	'(sp) or (sp)'	
#	Number Sign	++	
"	Quotation Mark	"(sp) or (sp)"	
à	a grave	a` or `a	`a
â	a circumflex	a^ or ^a	^a
ç	c cedilla	c, or ,c	
è	e grave	e` or `e	`e
é	e acute	e´ or ´e	´e
ê	e circumflex	e^ or ^e	^e
î	i circumflex	i^ or ^i	^i
ô	o circumflex	o^ or ^o	^o
ù	u grave	u` or `u	`u
û	u circumflex	u^ or ^u	^u

Table 3-2. National Mode Compose Sequences (Cont.)

CHARACTER		THREE-KEY SEQUENCES	TWO-KEY SEQUENCES
Finnish Keyboard			
#	Number Sign	++	
@	Commercial at	aa or AA or aA or Aa	
'	Apostrophe	'(sp) or (sp)'	
"	Quotation Mark	"(sp) or (sp)"	
Ä	A umlaut	A¨ or ¨A	
Å	A ring	A* or *A	
Ö	O umlaut	O¨ or ¨O	
Ü	U umlaut	U¨ or ¨U	
ä	a umlaut	a¨ or ¨a	
å	a ring	a* or *a	
é	e acute	e´ or ´e	
ö	o umlaut	o¨ or ¨o	
ü	u umlaut	u¨ or ¨u	
Danish Keyboard			
#	Number Sign	++	
'	Apostrophe	'(sp) or (sp)'	
@	Commercial at	aa or AA or aA or Aa	
'	Single Quote	`(sp) or (sp)`	
"	Quotation Mark	"(sp) or (sp)"	
~	Tilde	~(sp) or(sp)~	
Å	A ring	A* or *A	
Ø	O slash	O/ or /O	
Æ	AE ligature	AE (order sensitive)	
å	a ring	a* or *a	
ø	o slash	o/ or /o	
æ	ae ligature	ae (order sensitive)	
German Keyboard			
#	Number Sign	++	
§	Section	SO or OS or sO or Os or So or oS or so or os or S0 or 0S or s0 or 0s or S! or !S or s! or !s	
'	Apostrophe	'(sp) or (sp)'	
'	Single Quote	`(sp) or (sp)`	
"	Quotation Mark	"(sp) or (sp)"	
Ä	A umlaut	A¨ or ¨A	
Ö	O umlaut	O¨ or ¨O	
Ü	U umlaut	U¨ or ¨U	
ä	a umlaut	a¨ or ¨a	
ö	o umlaut	o¨ or ¨o	
ß	German small sharps	ss	
ü	u umlaut	u¨ or ¨u	

Table 3-2. National Mode Compose Sequences (Cont.)

CHARACTER		THREE-KEY SEQUENCES	TWO-KEY SEQUENCES
Dutch Keyboard			
£	Pound Sign	l- or L- or l= or L= or -l or -L or =l or =L	
¾	Three Quarters	34 (order sensitive)	
ij	ij sign	ij (order sensitive)	
½	One Half	12 (order sensitive)	
ƒ	Florin	f- (order sensitive)	
'	Apostrophe	'(sp) or (sp)'	
¼	One-quarter	14 (order sensitive)	
'	Single Quote	`(sp) or (sp)`	
´	acute accent	''	
..	dieresis	"^ or ^"	
Italian Keyboard			
£	Pound Sign	l- or L- or l= or L= or -l or -L or =l or =L	
§	Section	s! or S! or so or So or sO or SO or s0 or S0 or !s or !S or os or oS or 0s or 0S	
'	Apostrophe	'(sp) or (sp)'	
°	Degree Sign	0^ or ^0	
"	Quotation Mark	"(sp) or (sp)"	
à	a grave	a` or `a	`a
ç	c cedilla	c, or, c	
è	e grave	e` or `e	`e
é	e acute	e´ or ´e	
ì	i grave	i` or `i	`i
ò	o grave	o` or `o	`o
ù	u grave	u` or `u	`u
French/Belgian Keyboard			
£	Pound Sign	l- or L- or l= or L= or -l or -L or =l or =L	
§	Section	s! or S! or so or So or sO or SO or s0 or S0 or !s or !S or os or oS or 0s or 0S	
'	Apostrophe	'(sp) or (sp)'	
'	Single Quote	`(sp) or (sp)`	
"	Quotation Mark	"(sp) or (sp)"	
à	a grave	a` or `a	`a
ç	c cedilla	c, or, c	
è	e grave	e` or `e	`e
ù	u grave	u` or `u	`u

Table 3-2. National Mode Compose Sequences (Cont.)

CHARACTER	THREE-KEY SEQUENCES	TWO-KEY SEQUENCES
Swiss (French) Keyboard		
' Apostrophe	'(sp) or (sp)'	
" Quotation Mark	"(sp) or (sp)"	
à a grave	a` or `a	`a
ä a umlaut	a¨ or ¨a	¨a
ç c cedilla	c, or, c	
è e grave	e` or `e	`e
é e acute	e´ or ´e	
ê e circumflex	e^ or ^e	^e
î i circumflex	i^ or ^i	^i
ô o circumflex	o^ or ^o	^o
ö o umlaut	o¨ or ¨o	¨o
û u circumflex	u^ or ^u	^u
ü u umlaut	u¨ or ¨u	¨u
ù u grave	u` or `u	`u
Swiss (German) Keyboard		
' Apostrophe	'(sp) or (sp)'	
" Quotation Mark	"(sp) or (sp)"	
à a grave	a` or `a	`a
ä a umlaut	a¨ or ¨a	¨a
ç c cedilla	c, or ,c	
ê e circumflex	e^ or ^e	^e
é e acute	e´ or ´e	
è e grave	e` or `e	`e
î i circumflex	i^ or ^i	^i
ö o umlaut	o¨ or ¨o	¨o
ô o circumflex	o^ or ^o	^o
û u circumflex	u^ or ^u	^u
ù u grave	u` or `u	`u
ü u umlaut	u¨ or ¨u	¨u
Swedish Keyboard		
# Number Sign	++	
' Apostrophe	'(sp) or (sp)'	
" Quotation Mark	"(sp) or (sp)"	
Ä A umlaut	A¨ or ¨A	
Å A ring	A* or *A	
É E acute	E´ or ´E	
Ö O umlaut	O¨ or ¨O	
Ü U umlaut	U¨ or ¨U	
ä a umlaut	a¨ or ¨a	
å a ring	a* or *a	
é e acute	e´ or ´e	
ö o umlaut	o¨ or ¨o	
ü u umlaut	u¨ or ¨u	

Table 3-2. National Mode Compose Sequences (Cont.)

CHARACTER		THREE-KEY SEQUENCES	TWO-KEY SEQUENCES
Norwegian Keyboard			
#	Number Sign	++	
'	Apostrophe	'(sp) or (sp)'	
@	Commercial at	AA or Aa or aA or aa	
`	Single Quote	`(sp) or (sp)`	
"	Quotation Mark	"(sp) or (sp)"	
~	Tilde	~(sp) or (sp)~	
Å	A ring	A* or *A	
Æ	AE ligature	AE (order sensitive)	
Ø	O slash	O/ or /O	
å	a ring	a* or *a	
æ	ae ligature	ae (order sensitive)	
ø	o slash	o/ or /o	
Spanish Keyboard			
£	Pound Sign	l- or L- or l= or L= or -l or -L or =l or =L	
§	Section	s! or S! or so or So or sO or SO or s0 or S0 or !s or !S or os or oS or Os or OS or 0s or 0S	
"	Quotation Mark	"(sp) or (sp)"	
'	Apostrophe	'(sp) or (sp)'	
¡	Inverted !	!!	
¿	Inverted ?	??	
°	Degree Sign	O^ or ^O	
`	Single Quote	`(sp) or (sp)`	
~	Tilde	~(sp) or (sp)~	
Ñ	N Tilde	N~ or ~N	~N
ñ	n tilde	n~ or ~n	~n
ç	c cedilla	c, or ,c	
Portuguese Keyboard			
'	Apostrophe	'(sp) or (sp)'	
`	Single Quote	`(sp) or (sp)`	
"	Quotation Mark	"(sp) or (sp)"	
~	Tilde	~(sp) or (sp)~	
Ã	A tilde	~A or A~	~A
Õ	O tilde	~O or O~	~O
ã	a tilde	~a or a~	~a
õ	o tilde	~o or o~	~o

KEYBOARD LAYOUTS

The various keyboard layouts that are available on the CIT324 terminal are shown on the following pages. The keyboard layouts can be changed by selecting a different parameter for the "Keyboard Layout" field in the Keyboard Set-Up Menu.

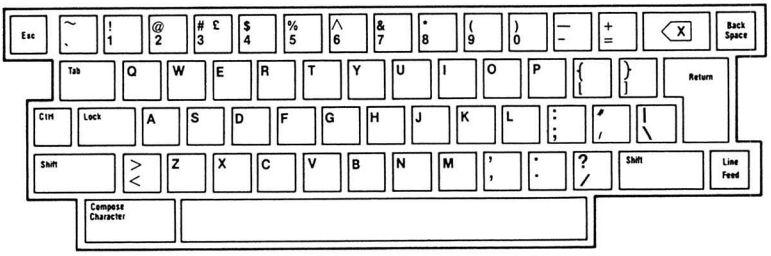

Figure 3-6. North American/United Kingdom Keyboard

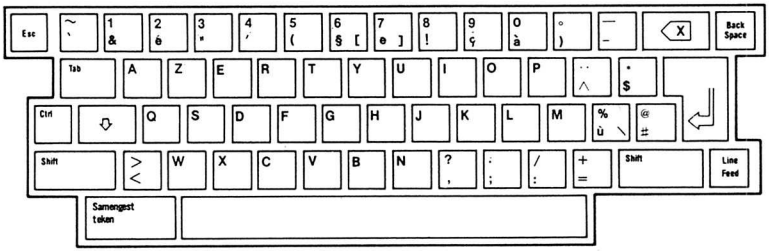

Figure 3-7. Flemish Keyboard

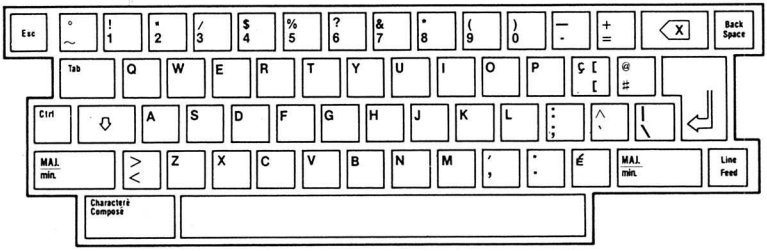

Figure 3-8. Canadian (French) Keyboard

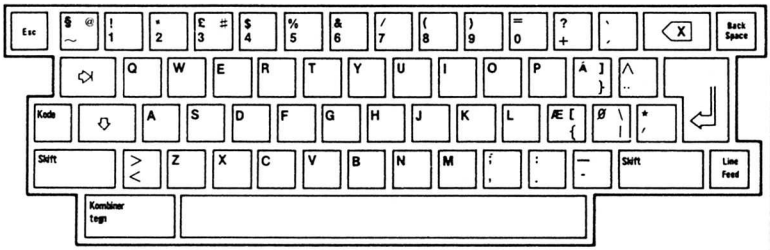

Figure 3-9. Danish Keyboard

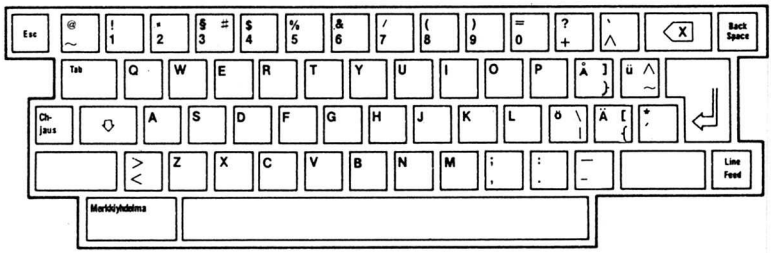

Figure 3-10. Finnish Keyboard

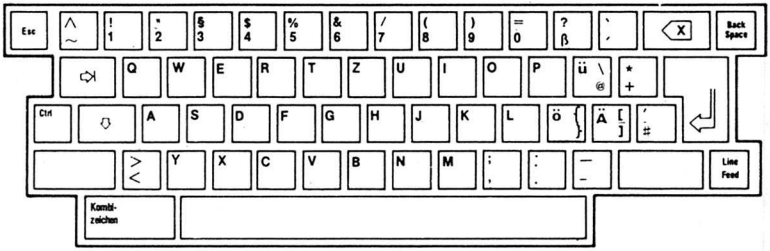

Figure 3-11. German Keyboard

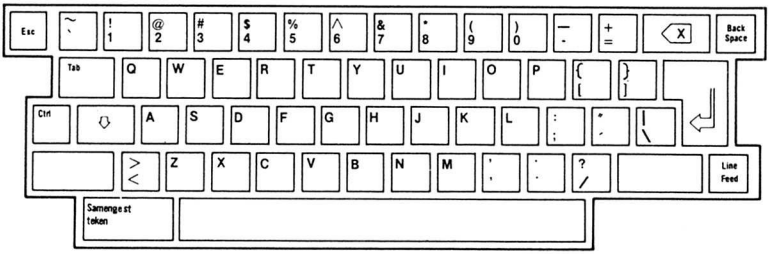

Figure 3-12. Dutch Keyboard

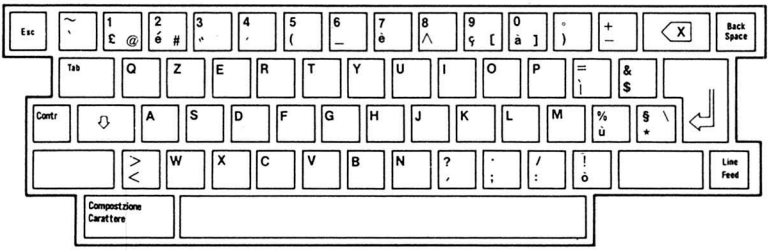

Figure 3-13. Italian Keyboard

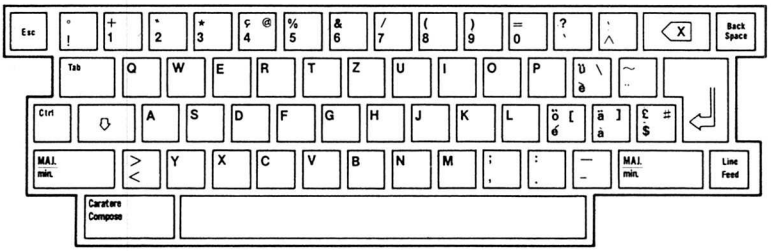

Figure 3-14. Swiss (French) Keyboard

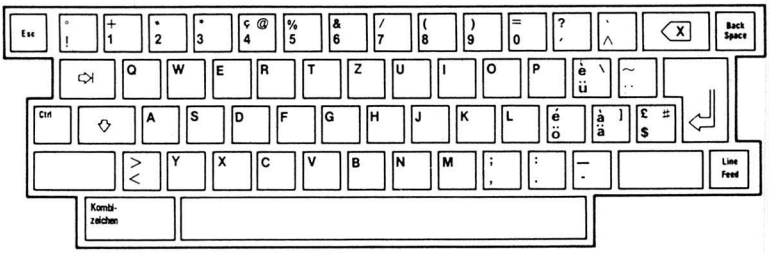

Figure 3-15. Swiss (German) Keyboard

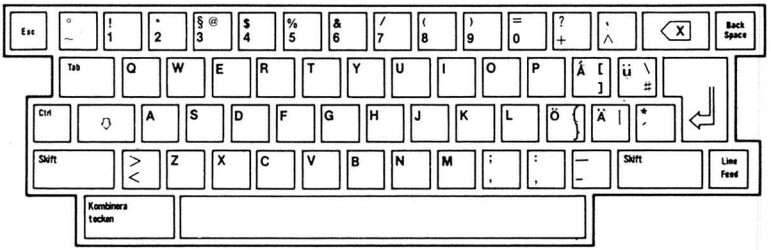

Figure 3-16. Swedish Keyboard

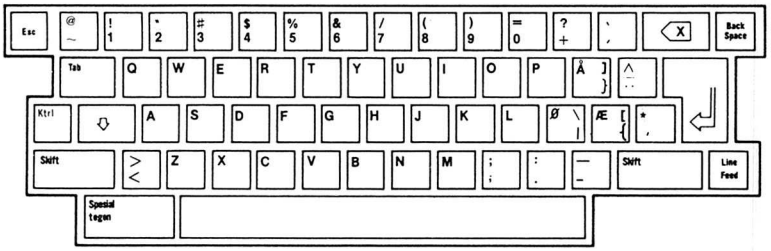

Figure 3-17. Norwegian keyboard

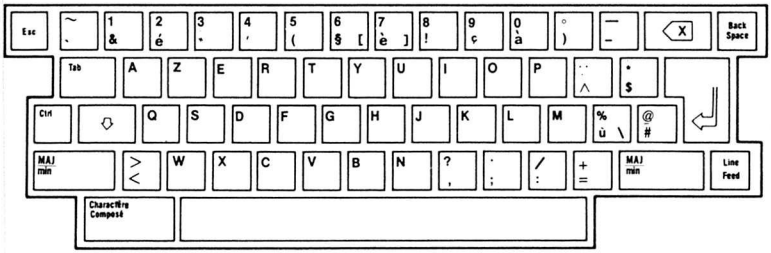

Figure 3-18. French (Belgian) Keyboard

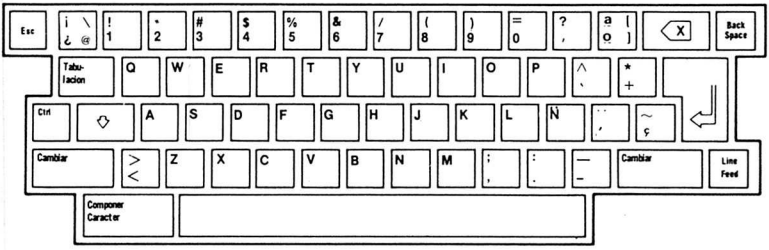

Figure 3-19. Spanish Keyboard

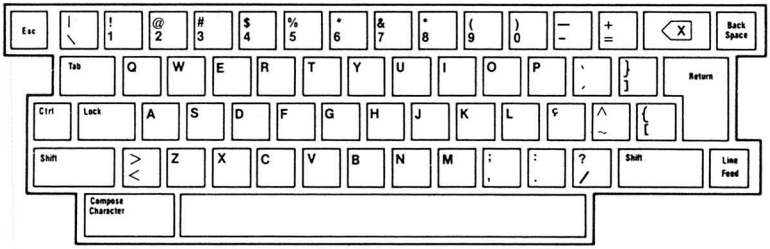

Figure 3-20. Portuguese Keyboard

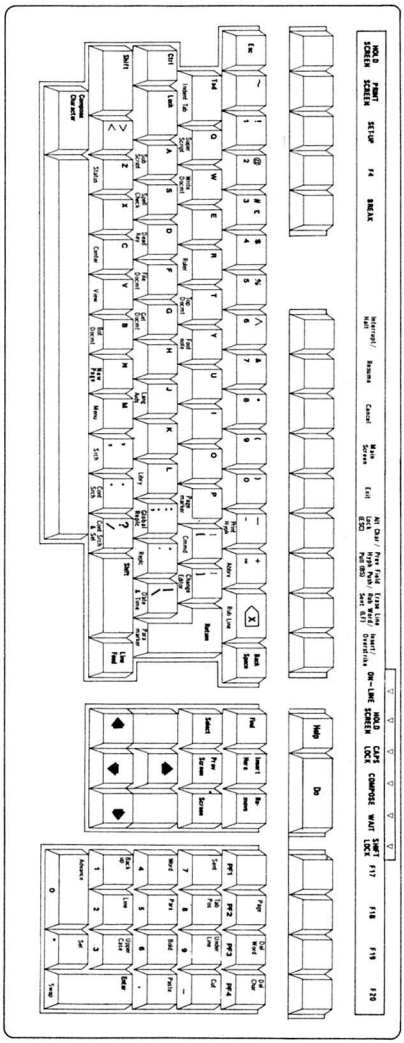

Figure 3-21. North American/United Kingdom (word processing key layout)

CHAPTER 4

THE SET-UP MODE

The CIT324 Set-Up Mode is used to configure or examine terminal operating features. This section contains information on the CIT324 set-up features and how to examine or change them.

The terminal utilizes special non-volatile memory (NVR) to "remember" individual feature selections, settings and parameters even after power has been removed. The user may choose to set features either temporarily (not saved after power is turned off), or permanently (until changed by the user). A Save Parameters operation can be performed in the Main Set-Up Menu.

For convenience, there exists a factory default set of parameters that can easily be restored by selecting the "Default Parameters" option in the Main Set-Up Menu.

SET-UP MODE ORGANIZATION

There are ten set-up menus in the CIT324's standard set-up mode. These menus allow you to select most of the terminal's operating parameters, such as communications protocol, display parameters, and keyboard parameters. In addition, the CIT324 provides a Set-Up Help Menu (which lists the keys which can be used to select set-up menus) and a Programmable Key Editor (which allows you to define the CIT324's programmable keys).

The set-up mode is entered by pressing the SET-UP key.

Once the set-up mode has been entered, the terminal immediately enters the Main Set-Up Menu. All other set-up menus can be selected through this menu -- including the Set-Up Help menu (accessed by pressing the HELP key). Once in the set-up menus, select the "Return to Main Menu" option or press the F6 key to return to the Main Set-Up Menu.

When the CIT324 is in any of the set-up modes, the previous contents of the display are stored internally. If XOFF has been enabled through the Communications Set-Up Menu, no incoming data is lost. Upon exiting set-up mode, the original contents of the display are restored and XON is transmitted (if XON/XOFF protocol were active at the time Set-Up mode was entered).

Several features are common to all set-up screen menus. These are: the menu title, a terminal identifier, and a status line. A function key labels line also appears at the top of most set-up screens.

The firmware revision number can be accessed by pressing <SHIFT> <ENTER> in any of the set-up menus. The revision is displayed on the status line.

Menu Title

This feature identifies the current menu displayed. The list below indicates the order in which menus are accessed. Specific menus may be accessed from the Main Set-Up Menu or by using the F-key equivalents shown in the Main or Set-Up Help menus.

- Main Set-Up Menu
- Terminal Set-Up Menu
- Display Set-Up Menu
- Display Enhancements Menu
- Keyboard Set-Up Menu
- Keyboard Enhancements Menu
- Communications Set-Up Menu
- Auxiliary Set-Up Menu
- Auxiliary Enhancements Menu
- Tabs Set-Up Menu

Other menus include:

- Set-Up Help Menu
- Programmable Key Editor Menu

Terminal Identifier

This feature identifies the terminal being used. In this instance, the terminal is a CIT324. This identifier can be changed by pressing <CTRL> <SHIFT> <HOLD SCREEN>. Type the new name (up to 11 characters) and press return.

Function Key Label Line

This line appears at the top of most screens. It lists most of the function keys which can be used to select the various set-up menus.

Status Line

The status line displays across the bottom of each set-up menu. It consists of six fields which provide messages to the operator indicating the status of certain terminal features. Figure 4-1 shows a typical status line.

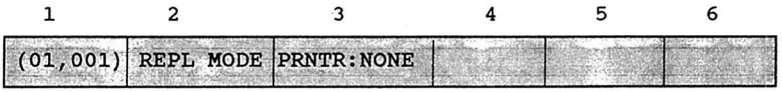

Figure 4-1. Set-Up Status Line

The following are the possible status line messages.

Message 1 - Cursor Position

(l, c) The cursor is currently at line l, column c.

Message 2 - Insert/Replace Mode

INS MODE	As new data is entered, the old data from the cursor position to the end of the line shifts right one character. Any characters shifted into the right margin are lost unless autowrap is enabled in the Display Set-Up Menu.
REPL MODE	All new data replaces the old characters from the cursor position. (This is the default setting.)

Message 3 - Printer Mode

PRNTR:READY	The printer is ready to receive data.
PRNTR:NOT RDY	The printer is not ready to receive data.
PRNTR:NONE	There is no printer.
PRNTR:AUTO	Auto Print mode is active.
PRNTR:CONTROL	Printer Controller mode is active.
PRNTR:CONCURR	Concurrent Print mode is active.

Message 4 - Modem

MODEM:DSR	The DSR signal on the communications port is active and the modem is able to send and receive data from the host.
MODEM:NO DSR	The DSR signal on the communications port is inactive. The modem is not able to send or receive data from the host.

Message 5 - Keyboard Mode Select

<No Display>	Selecting by pressing SHIFT, PF3. Indicates data is directed from the keyboard to the communications port exclusively. This is the normal default mode.
KYBD TO AUX	Selected by pressing SHIFT, PF2. Indicates data is directed from the keyboard to the auxiliary port exclusively.

Message 6 - Auxiliary Port Mode

<No Display>	Selected by pressing <CTRL> <SHIFT> <PF4>. Disables all special auxiliary input routing. This is the default state.
AUX TO COMMS	Selected in the On-Line operating state by pressing <CTRL> <SHIFT> <PF2>. Data received at the auxiliary port is directed to the communications port.
AUX TO DISPLAY	Selected in the On-Line operating state by pressing <CTRL> <SHIFT> <PF3>. Data received at the auxiliary port is directed to the display screen.
AUX TO COM,DSP	This selection is a combination of the above two features. Data received at the auxiliary port is directed to both the communications port and the display screen.

SET-UP FIELD PARAMETERS

The field parameters displayed in each of the set-up menus describe the current status of the features or commands available. The parameters allow the operator three possible actions:

1. Direct Command

   This type of field parameter (which has only one value) displays a command that is performed when the ENTER key is pressed. For example, pressing ENTER when the cursor is on "Reset Terminal" field in the Main Set-Up Menu performs a soft terminal reset.

2. Select Parameter

   This type of field parameter contains text that describes the current parameter value selected from two or more possible options. To replace the current value, press the ENTER key and the field advances to the next value.

   For example, pressing ENTER when the cursor is on the "Keypad : Numeric" field in the Keyboard Set-Up Menu causes the field to change to "Keypad : Application".

3. Enter Parameter

   This type of field parameter allows text entry from the keyboard. The following steps describes how to enter text:

   A. Using the arrow keys, advance the field cursor to the desired parameter.

   B. Press ENTER.

   C. Type in the desired value.

   D. Press ENTER (or, in some cases, RETURN) to set the new value.

   To correct a typing error, press the <x] (DELETE) key. The character to the left of the cursor is erased. To abort the field without making any changes, press an arrow key to go to another field parameter.

SET-UP FIELD CURSOR

The CIT324 uses a highlighted field cursor in the set-up mode. It highlights the entire field you want to examine or change. The arrow keys move the field cursor up, down, left or right. When the field cursor is on the last field of a set-up screen, pressing the down arrow key (↓) will return the cursor to the top left field parameter. Similarly, when the field cursor is on the top left field parameter, pressing up arrow key (↑) moves the cursor to the bottom right field.

SELECTION OF SET-UP SCREEN MENU

Press the SET-UP key on the keyboard to enter the standard set-up mode. The Main Set-Up Menu appears on the screen. Additional menus are entered by selecting the corresponding field on the Main Set-Up Menu and then pressing the ENTER key. To return to the Main Set-Up Menu, place the field cursor over the field parameter "Return to Main Menu" and press ENTER. To exit the set-up mode, press the SET-UP key again.

SAVE AND RECALL OPERATIONS

Any changes made in a set-up menu are temporary until permanently stored in memory with a SAVE operation. Temporary changes are lost if power is removed, the terminal is reset, a RECALL operation is performed, or factory default conditions are restored.

SAVE	Set-Up parameters are stored in non-volatile memory (NVR) on a permanent basis by selecting "SAVE Parameters" in the Main Set-Up Menu.
Recall	The user-stored permanent set-up conditions are automatically restored whenever the terminal is turned on or reset. In addition, a special RECALL operation may be performed to reinstate permanently stored set-up parameters by selecting "Recall Parameters" in the Main Set-Up Menu.
Default	The factory established default conditions may be restored by selecting "Default Parameters" in the Main Set-Up Menu.

SET-UP MODE MENUS

In the following descriptions of the set-up screen menus, each menu appears with default values as it would display when the terminal is first turned on. Following the screen menu illustrations are listings of the fields, by default values, which are underlined. The available selections follow the default value along with a short description of the function of that particular feature. The Programmable Key Editor Menu is described in the following section.

Main Set-Up Menu

This is the first menu displayed upon pressing the SET-UP key. From the Main Set-Up Menu, the other set-up menus can be accessed by selecting the corresponding field or pressing the corresponding function key. The Main Set-Up Menu also is used to save or restore changes made in the other set-up menus.

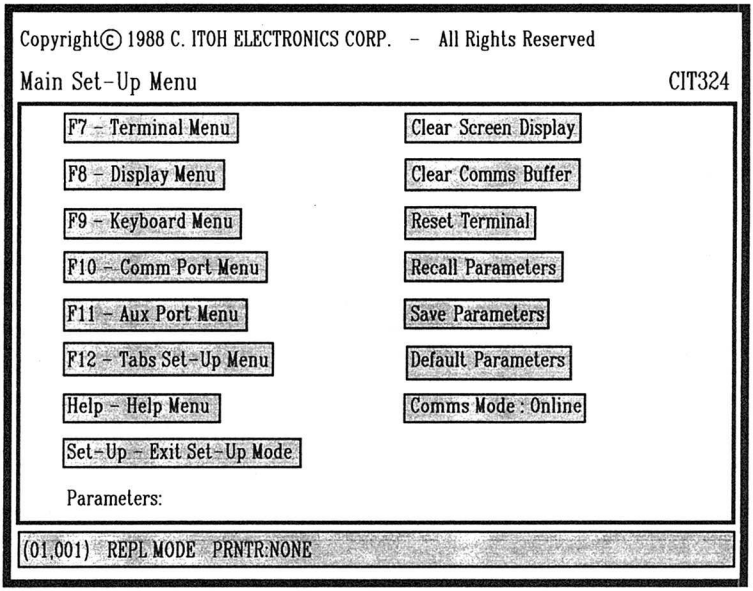

Figure 4-2. Main Set-Up Menu

Field: Options -- Function

F7 - Terminal Menu -- Enters the Terminal Set-Up Menu.

F8 - Display Menu -- Enters the Display Set-Up Menu. A second display menu (the Display Enhancements Menu) can be accessed from this menu.

F9 - Keyboard Menu -- Enters the Keyboard Set-Up Menu. A second keyboard menu (the Keyboard Enhancements Menu) can be accessed from the Keyboard Set-Up Menu.

F10 - Comms Port Menu -- Enters the Communications Set-Up Menu.

F11 - Aux Port Menu -- Enters the Auxiliary Set-Up Menu. A second AUX port menu (the Auxiliary Enhancements Menu) can be accessed from this menu.

F12 - Tabs Set-Up Menu -- Enters the Tabs Set-Up Menu.

Help - Help Menu -- Enters the Set-Up Help Menu.

Clear Screen Display -- Clears the display upon exiting the set-up mode. The status line displays the word "Done" while still in the set-up mode.

Clear Comms Buffer -- Aborts all communication operations and clears the buffers. Clears any XOFF condition on both ports. XON is sent to the host port.

Reset Terminal -- Resets several operating parameters to default conditions. Performs the same function as the Soft Terminal Reset control sequence.

Recall Parameters -- Resets the terminal to parameters last saved in NVR with the SAVE feature. Clears the display screen.

Save Parameters -- Saves operator set-up mode selections in NVR. This is inhibited when a print operation is in progress.

Default Parameters -- Restores the original factory default set-up values, clears the display, and relocates the cursor at the upper-left corner of the display screen. DEFAULT disconnects communication between the host and the terminal during its operation.

Comms Mode: Online, Local -- Online places the terminal in communication with the host computer. Local directs keyboard data to the display screen only; no interaction with the host computer occurs.

Set-Up - Exit Set-Up Mode -- Exits the set-up mode and returns the terminal to normal operations.

Terminal Set-Up Menu

The Terminal Set-Up Menu allows the operator to select various operating parameters as described below.

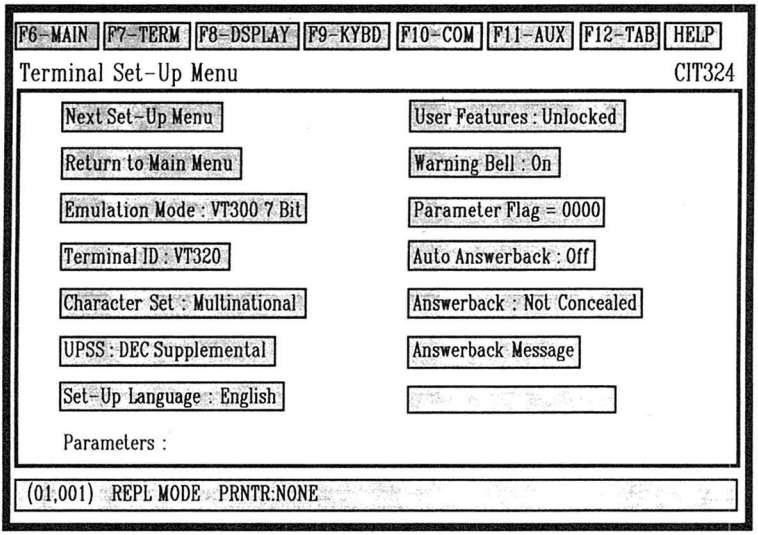

Figure 4-3. Terminal Set-Up Menu

Field: Options -- Function

Next Set-Up Menu -- Advances to the next set-up menu. In this case it is the Display Set-Up Menu.

Return to Main Menu -- Returns the screen to the Main Set-Up Menu.

Emulation Mode: VT300 Mode 7-Bit, VT300 Mode 8-Bit, VT52 Mode, VT100 Mode -- Selects the emulation mode to be used.

The VT300 7-Bit controls mode executes standard ANSI functions. It sends 7-bit control codes and characters and accepts both 7- and 8-bit control codes if 8-bit parity is enabled in the Communications Set-Up Menu.

The VT300 8-Bit controls mode executes standard ANSI functions. It sends 8-bit control codes and characters and accepts both 7- and 8-bit control codes if 8-bit parity is enabled in the Communications Set-Up Menu.

The VT52 mode executes non-ANSI, DEC private functions and restricts programs to existing VT52 applications programs.

The VT100 mode executes standard ANSI functions. This mode is used with application programs requiring strict compliance to CIT-101 or DEC VT100 terminals. Only 7-bit control codes are executed.

Terminal ID: VT320, VT100, VT101, VT102, VT220 -- Selects the response to an inquiry from the host as to what type of terminal is online.

Character Set: Multinational, National -- Multinational selects the 8-bit multinational characters. National selects one of the eleven 7-bit national character sets as chosen from the keyboard field in the Keyboard Set-Up Menu.

NOTE

On the North American Keyboard, only the multinational character set mode is available.

UPSS: DEC Supplemental, ISO Latin-1 -- DEC Supplemental selects DEC Supplemental character set. ISO Latin-1 selects International Standard Organization (ISO) character set.

Set-Up Language: English, French, German -- Provides a choice among three languages in which the set-up screen menus are displayed.

User Features: Unlocked, Locked -- Unlocked allows the host to change the following operating parameters. Locked prevents the host from changing them.

Auto Repeat
Keyboard Lock
Light/Dark Screen
Smooth/Jump Scroll
Tabs Stops

NOTE

Certain application programs require control of these features. Select the UNLOCKED parameter to conform to such programs.

Warning Bell: On, Off -- If the Warning Bell is ON a beep tone will sound if an operating error is detected, or when a CTRL G sequence is received.

Parameter Flag: 0000 to 1111 -- The parameter report flag can be set to a value between 0000 and 1111.

Auto Answerback: Off, On -- When the Auto Answerback function is on, the answerback message (if present) is sent automatically to the host after power-up, or upon receiving an ENQ from the host.

Answerback: Not Concealed, Concealed -- Selecting Not Concealed causes the answerback message to display on the screen. Concealed causes the message to be concealed from view. Once this feature is set to Concealed, it cannot be changed to Not Concealed until a new answerback message is generated.

Answerback Message -- This field allows the operator to enter the answerback message. The answerback feature allows the CIT324 terminal to identify itself to the host. The answerback message is entered by the operator during set-up. It is transmitted to the host either automatically (when the host computer requests identification by sending the ASCII ENQ code (05H) to the terminal), or when you press the CTRL and BREAK keys simultaneously. The message may consist of a maximum of 30 ASCII characters. If auto answerback is on, the answerback message is sent to the host when the terminal is turned on.

Display Set-Up Menu

The Display Set-Up Menu contains field parameters to set display features as described below.

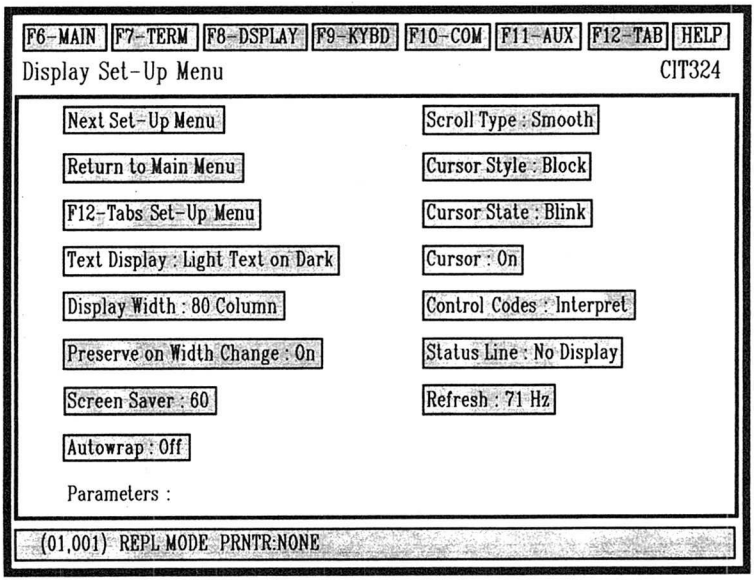

Figure 4-4. Display Set-Up Menu

Field: Options -- Function

Next Set-Up Menu -- Advances to the next set-up menu. In this case it is the Display Enhancements Menu.

Return to Main Menu -- Returns the screen to the Main Set-Up Menu.

F12 - Tabs Set-Up Menu -- Enters the Tabs Set-Up Menu.

Text Display: Light Text on Dark, Dark Text on Light -- Sets the video display to either a dark screen with light text (normal) or a light screen with dark text (reverse video).

Display Width: 80 Column, 132 Column -- Selects either 80 or 132 column screen width. When a change is entered, the screen immediately converts to the desired width. The current contents of the display are either preserved or lost depending upon the setting of the Preserve On Width Change selection.

Preserve on Width Change: On, Off -- Selects whether screen data is preserved or cleared on changing the screen size between 80 and 132 columns.

Screen Saver: 60, Off, 10,20,30,40,50 -- Disables the CRT saver feature, or sets the number of minutes of inactivity before the screen brightness diminishes. Pressing any key will restore the display; pressing the SHIFT, CTRL, or CAPS LOCK keys will restore the display without alteration.

Auto Wrap: Off, On -- When auto wrap is ON, the cursor automatically moves to column one of the next line down when it reaches the end of the display line. When auto wrap is OFF, the cursor will remain on the last character of the current line. Any received characters overwrite the existing character at that position.

Scroll Type: Smooth, Jump -- Smooth scroll sets a constant speed at which new lines scroll on to the screen, causing a steady, controlled scroll. Jump scroll allows the terminal to display data as fast as possible, giving the effect of a "jump" scroll.

Cursor Style: Block, Underline -- Selects either a block or an underline as the cursor.

Cursor State: Blink, Static -- Selects either a blinking or a static cursor.

Cursor: On, Off -- Determines whether or not the cursor is visible.

Control Codes: Interpret, Display -- If set to Interpret, control codes received from the host are interpreted, but not displayed. If set to Display, control codes are displayed, but not executed.

Status Line: No Display, Indicator, Host Writable -- Select how and when to display the status line at the bottom of the screen. If set to No Display, the status line only appears when you are in set-up. If set to Host Writable, host applications can write messages in place of the status line.

Refresh: 71 Hz, 60 Hz -- Determines whether the screen is refreshed 71 or 60 times per second.

Display Enhancements Menu

The Display Enhancements Menu contains field parameters to set additional display features, as described below.

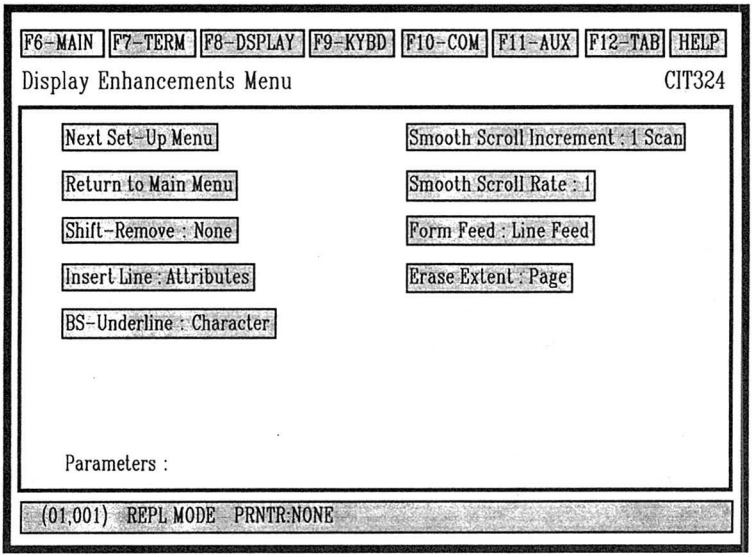

Figure 4-5. Display Enhancements Menu

Field: Options -- Function

Next Set-Up Menu -- Advances to the next set-up menu. In this case it is the Keyboard Set-Up Menu.

Return to Main Menu -- Returns the screen to the Main Set-Up Menu.

Shift-Remove: None, 1-24, 1-25, 25 -- Pressing the SHIFT and REMOVE keys clears the screen and/or 25th row status line. If set to None, no action is taken when pressing the SHIFT and REMOVE keys. 1-24 clears the screen and homes the cursor. 1-25 clears the screen and the 25th row status line, and homes the cursor. 25 clears the 25th row status line only.

Insert Line: Attributes, Blank -- Allows the operator to select whether the inserted line will have the attributes of the line at which the cursor is positioned, or a blank (no attributes) line.

BS-Underline: Character, Attribute -- With Character enabled, a <Char> <BS> <Underline> sequence results in erasure of the character by the underline character. With Attribute enabled, the sequence is automatically converted to a character with the underline attribute set.

Smooth Scroll Increment: 1 Scan, 2 Scan -- Sets the number of scan lines to either 1 or 2 when in smooth scroll display. Selecting 2 scan lines results in a faster scroll rate.

Smooth Scroll Rate: 1 to 9 -- Selects the speed of the smooth scroll from 1 to 9, where 1 is the fastest and 9 is the slowest.

Form Feed: Line Feed, Home & Clear -- Selects the response to a Form Feed (FF) from the host. Line Feed performs a Line Feed (LF) action, and Home & Clear clears the screen and homes the cursor.

Erase Extent: Page, Margins -- Sets the area to be erased on a Clear Screen command: either the entire page or the area defined by margins.

Keyboard Set-Up Menu

The Keyboard Set-Up Menu contains field parameters to select operating features pertinent to the keyboard.

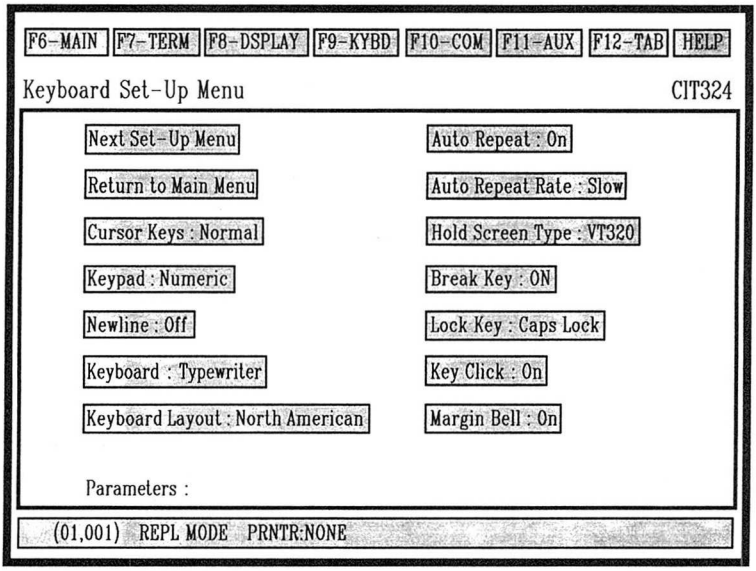

Figure 4-6. Keyboard Set-Up Menu

Field: Options -- Function

Next Set-Up Menu -- Advances to the next set-up menu. In this case it is the Keyboard Enhancements Menu.

Return to Main Menu -- Returns the screen to the Main Set-Up Menu.

Cursor Keys: Normal, Applications -- Selecting the Normal mode causes the cursor keys (↑,↓,←,→) to generate standard ANSI control codes. Selecting the Applications mode allows the application software to control the keys.

Keypad: Numeric, Applications -- In the Numeric mode, the keypad generates the ASCII characters matching the 0-9 number keys, the period key, and the minus sign key. Control functions are generated by the PF1 through PF4 keys. In the Applications mode, the keypad generates special application escape sequences.

New line: Off, On -- When the New line mode is off, the terminal will execute a carriage return when the RETURN key is pressed or the CR code is received. When the New line mode is on, pressing the RETURN key or receiving a CR code will cause the terminal to execute a carriage return and a line feed.

Keyboard Type: Typewriter, Data Processing -- On some of the international keyboards, some of the keys can produce special characters. These special characters are inscribed on the keycaps to the right of the normal characters. Selecting the Typewriter parameter allows the normal characters to be produced, while selecting the Data Processing parameter allows the special characters to be produced.

Keyboard Layout: North American, British, Flemish, Canadian (French), Danish, Finnish, German, Dutch, Italian, Swiss (French), Swiss (German), Swedish, Norwegian, French (Belgian), Spanish, Portuguese -- Allows the operator to choose the terminal's operating mode to match the national keyboard used.

Auto Repeat: On, Off -- When it is on, the Auto Repeat feature causes a key that is held down for 0.5 seconds or longer to be repeated automatically until that key is released. Turning this feature off prevents the key from repeating automatically.

Auto Repeat Speed: Slow, Fast -- Sets the auto repeat speed.

Hold Screen Type: VT320, VT52 -- When set to VT320, the HOLD SCREEN key toggles between freezing and releasing the screen. When set to VT52, pressing <CTRL> <HOLD SCREEN> causes the terminal to enter the Hold Screen mode. Pressing the HOLD SCREEN key will then cause one line of data to be scrolled onto the screen. Pressing <SHIFT> <HOLD SCREEN> will cause an entire screen to be scrolled.

Break Key: On, Off -- When this feature is turned on, pressing the BREAK key will send a break signal to the host computer. When this feature is turned off, pressing the BREAK key will have no effect. Note that the Shift-Break function is not affected by this setting.

Lock Key: Caps Lock, Shift Lock -- Determines which keys are affected by the LOCK key. When set to CAPS LOCK and the LOCK key is pressed, only the alphabetic character keys produce the shifted (capital) characters when pressed. The numeric and special character keys (such as ', \ and [) will not be affected.

When set to SHIFT LOCK and the LOCK key pressed, all keys on the main keypad will produce the shifted characters when pressed.

Keyclick: On, Off -- Selects whether or not a clicking sound is made when a key is pressed.

Margin Bell: On, Off -- Causes a beep tone to occur when the cursor is eight columns from the right margin.

Keyboard Enhancements Menu

The Keyboard Enhancements Menu provides additional keyboard features, as described below.

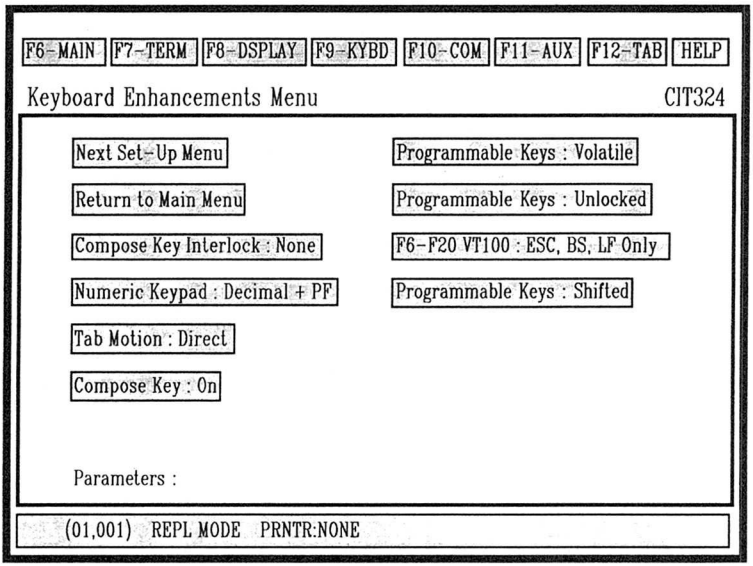

Figure 4-7. Keyboard Enhancements Menu

Field: Option -- Function

Next Set-Up Menu -- Advances to the next set-up menu. In this case it is the Communications Set-Up Menu.

Return to Main Menu -- Returns the screen to the Main Set-Up Menu.

Compose Key Interlock: None, Control -- Selects whether the COMPOSE CHARACTER key is set to function with the CTRL key or alone -- without having to press another key.

Numeric Keypad: Decimal + PF, Hex -- Selects the function of the numeric keypad to operate as a decimal keypad or to generate hexadecimal codes.

Tab Motion: Direct, Spaces -- When set to Direct a tab causes the cursor to move to the next tab stop. When set to Spaces, spaces between stops are filled with the current cursor attribute.

Compose Key: On, Off -- Selects whether or not the Compose Character key works.

Programmable Keys: Volatile, Non-Volatile -- Selects whether the programmable keys are stored permanently in non-volatile memory or temporarily in volatile memory. When stored in volatile memory the programmable keys are cleared when a recall or reset operation is performed.

NOTE

A SAVE operation must be performed through the Main Set-Up Menu when the NVR option has been selected.

Programmable Keys: Unlocked, Locked -- Unlocked allows the host computer to change programmable keys that have been defined from the keyboard. Locked prevents the host from changing the programmable keys.

F6-F20 VT100: ESC, BS, LF Only, Programmable -- If set to ESC, BS, LF ONLY, the F11, F12 and F13 keys will generate ESC, BS and LF codes, respectively. All other function keys will be disabled. If set to Programmable the F6 through F20 function keys will work the same in the VT100 mode as they do in the VT300 mode.

Programmable Keys: Shifted, Unshifted -- Shifted sets the function keys to generate hard coded sequences when pressed directly. Pressing SHIFT F-Key generates the user-defined value of the function key. Unshifted does the opposite. Pressing the function key directly generates the user-defined value of the key. Pressing SHIFT F-Key generates the hard coded value of the key. This selection does not affect the action of the extended function keys F21-F50.

Communications Set-Up Menu

The Communications Set-Up Menu allows you to select the operating parameters that control communications between the computer and the terminal.

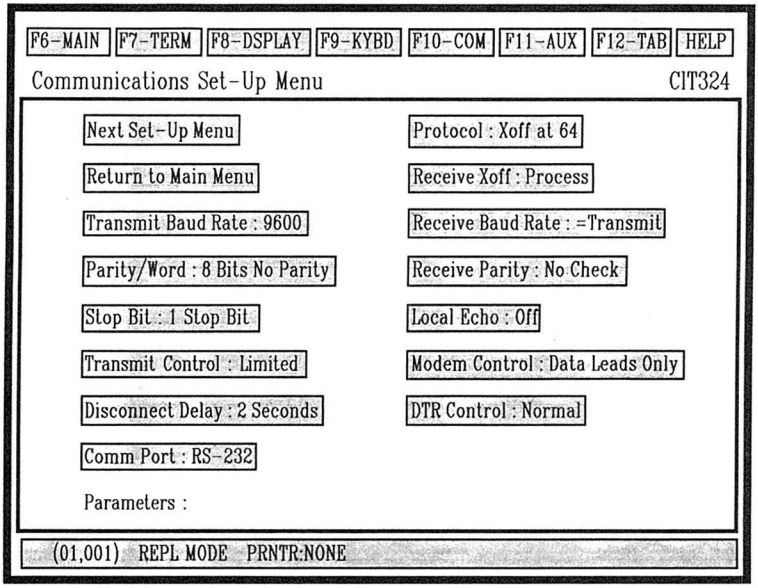

Figure 4-8. Communications Set-Up Menu

Field: Options -- Function

Next Set-Up Menu -- Advances to the next set-up menu. In this case it is the Auxiliary Set-Up Menu.

Return to Main Menu -- Returns the screen to the Main Set-Up Menu.

Transmit Baud Rate: 9600, 19200, 75, 110, 150, 300, 600, 1200, 2400, 4800 -- Sets the terminal's COMM port transmit speed to equal the host's receive speed.

Parity / Word: 8 Bits No Parity, 8 Bits Even, 8 Bits Odd, 7 Bits No Parity, 7 Bits Even, 7 Bits Odd, 7 Bits Mark, 7 Bits Space -- Selects word length and parity parameters the terminal uses to communicate with the host.

Stop Bit: 1 Bit, 2 Bits -- Selects the number of stop bits in the data word to match the host's communication parameters.

Transmit Control: Limited, Unlimited -- Limited restricts character transmission to 150-180 characters per second, no matter what the baud rate is set to. This reduces the operating system's interrupt burden. Unlimited removes limits to the character transmission speed.

Disconnect Delay: 2 Seconds, 60 ms -- Used in conjunction with the COMM port FDX and HDX Modem Controls, this feature causes a disconnect between the terminal and the host when the Received Line Signal Detection (RLSD) is lost for either 60 ms or 2 seconds. It is suggested that all countries, except the United Kingdom, use the 2 second delay parameter.

Comm Port: RS-232, RS-423 -- Selects which Comm connector is active. Cables can be connected to both connectors, but only one of them can be active at a time. When RS-232 is selected, the 25-pin connector is active. When RS-423 is selected, the 6-pin connector is active.

Protocol: XOFF at 64, XOFF at 128, No XOFF -- Allows the terminal to set the XOFF point at 64 or 128 characters in the receive buffer. NO XOFF disables the automatic XON/XOFF function. Note that if NO XOFF is selected, the HOLD SCREEN key will not work.

Receive Xoff: Process, Ignore -- Controls whether an incoming XOFF command is ignored or processed.

Receive Baud Rate: =Transmit, 75, 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200 -- Sets the terminal's COMM port receive speed to equal the host's transmit speed.

Receive Parity: No Check, On -- Determines whether or not the terminal checks incoming data for parity errors.

Local Echo: Off, On -- If the Local Echo mode is on, all keyboard transmissions are sent to the display screen as well as to the host computer. If the Local Echo mode is off, all keyboard transmissions are sent to the host computer only. The host then may or may not send (echo) the data back to the terminal for display.

Modem Control: Data Leads Only, FDX, HDX -- Selects the configuration of the COMM port when communicating with the host.

Data Leads Only is selected if the terminal connects directly to the host computer through the communications port. If the host computer is set for full duplex communications, No Local Echo should be set (see above). If it is set for half duplex, Local Echo should be enabled.

FDX Modem Control should be selected if a full duplex modem communication is used between the host and the terminal.

HDX Modem Control should be selected if a half duplex modem communication is used between the host and the terminal.

DTR Control: Normal, Switched -- Allows control of Data Terminal Ready (pin 20). Normal sets DTR to remain active high while the terminal is powered on, except when a <SHIFT> <BREAK> occurs; then RTS and DTR drop for 3.5 seconds. The Break function alone does not drop DTR low. Switched sets DTR low when the terminal is in the Local or set-up modes. The Break function does not drop DTR low.

Auxiliary Set-Up Menu

The Auxiliary Set-Up Menu allows the operator to select the printer (AUX) port parameters, as described below.

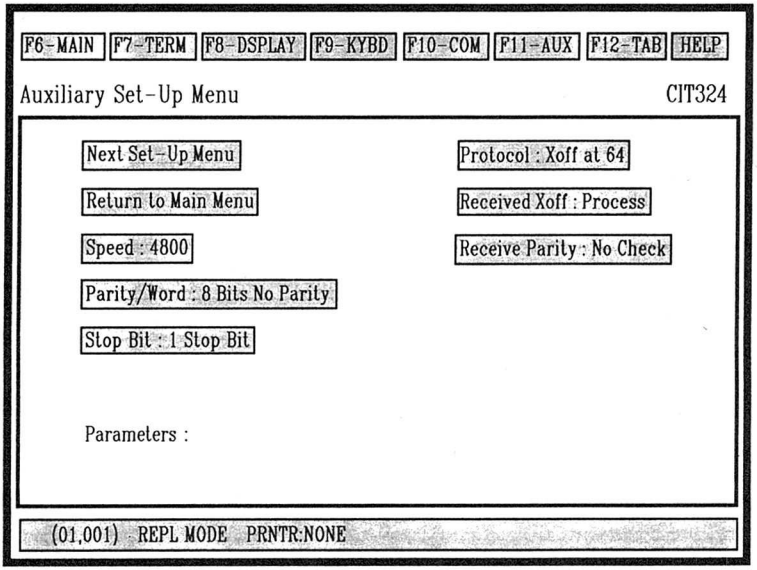

Figure 4-9. Auxiliary Set-Up Menu

Field: Options -- Function

Next Set-Up Menu -- Advances to the next set-up menu. In this case it is the Auxiliary Enhancements Menu.

Return to Main Menu -- Returns the screen to the Main Set-Up Menu.

Speed: 4800, 9600, 19200, 75, 110, 150, 300, 600, 1200, 2400 -- Selects the transmit speed to the printer.

Parity / Word: 8 Bits No Parity, 8 Bits Even, 8 Bits Odd, 7 Bits No Parity, 7 Bits Even, 7 Bits Odd, 7 Bits Mark, 7 Bits Space -- Selects the word length and parity parameters used by the printer port.

Stop Bit: 1 Bit, 2 Bits -- Selects the number of stop bits in the data word to match the printer's parameters.

Protocol: Xoff at 64, No Xoff -- Allows the terminal to set the XOFF point at 64 characters in the printer buffer. NO XOFF disables the automatic XON/XOFF function at the printer port.

Receive Xoff: Process, Ignore -- Enables or disables the processing of XOFF commands received on the Aux port.

Receive Parity: No Check, On -- Determines whether or not the terminal checks incoming data for parity errors.

Auxiliary Enhancements Menu

The Auxiliary Enhancements Menu provides additional auxiliary port selections which are not accessible from the Auxiliary Set-Up Menu.

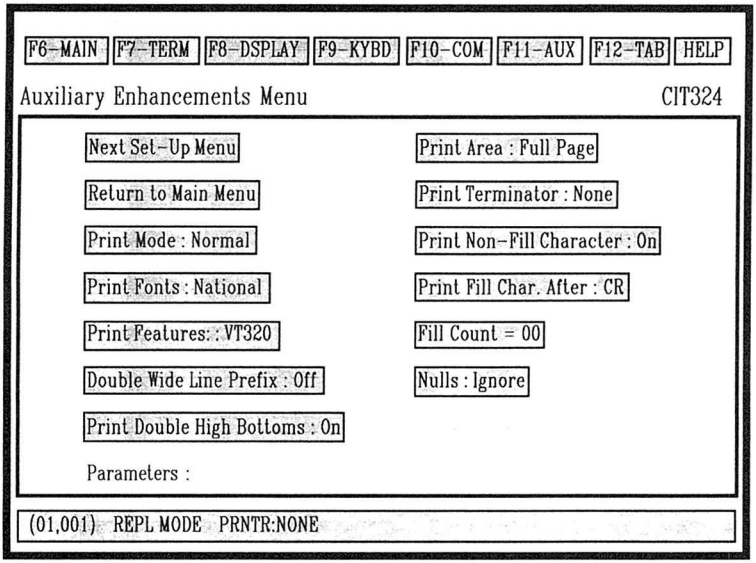

Figure 4-10. Auxiliary Enhancements Menu

Field: Options -- Function

Next Set-Up Menu -- Advances to the next set-up menu. In this case it is the Tabs Set-Up Menu.

Return to Main Menu -- Returns the screen to the Main Set-Up Menu.

Print Mode: Normal, Auto Print, Controller Mode, Concurrent Print -- Selects the printer operating mode. (The printer must be connected to the terminal before executing a print command.)

Normal Print Mode allows the operator to invoke all of the keyboard printing functions (Print Screen, Print Cursor Line, etc.) from the keyboard.

In the Auto Print Mode the current line of data is printed when the cursor is moved off the line by LF, FF, or VT. With the auto wrap feature on, as the cursor moves off the line, the completed line of data is printed.

In the Controller Mode the host has direct control of the printer. All data received from the host is sent to the printer and is not displayed on the monitor screen.

The Concurrent Print Mode directs data to the monitor screen and to another terminal or printer at the same time.

Print Fonts: National, Nat'l & Line Drawing, Multinational -- Specifies the character sets supported by the printer.

National is compatible with printers supporting multinational or national mode character sets.

National & Line Drawing is compatible with printers supporting multinational or national mode and line drawing capabilities.

Multinational is compatible with printers supporting multinational mode and line drawing sets only.

Print Features: VT320, CIT101 -- Selects the print features of the DEC VT320 or the CIT101.

Double Wide Line Prefix: Off, On -- Enables or disables the output of a prefix (^N) to indicate the data following is a double-wide line.

Print Double High Bottoms: On, Off -- Enables or disables the output of a second copy of data to the AUX port representing the bottom row of a double-high line.

Print Area: Full page, Scrolling Region -- If Full Page is selected, a Print Screen operation will cause the entire screen area (including margins) to be printed. If Scrolling Region is selected, only the screen area between predefined margins will be printed.

Print Terminator: None, Formfeed -- Determines whether or not a Form Feed (FF) code is sent to the printer at the end of a Print Page operation.

Print Non-Fill Character: On, Off -- Determines whether or not the Fill After character (CR or LF) selected in the following field is printed.

Print Fill Char. After: CR, LF -- Enables the output of a selected number of fill characters to the AUX port after transmitting either CR or LF code.

Fill Count: 00 to 99 -- Selects the number of fill characters to be transmitted from 0 to 99.

Nulls: Ignore, Pass -- Determines whether or not null characters received by the terminal are passed to the AUX port during print operations (such as Auto Print Mode, Controller mode, and Concurrent Print Mode.)

NOTE

In either setting, when "Display Controls" is selected in the Display Set-Up Menu, the '@' character appears in reverse video whenever a null character is received by the terminal.

Tabs Set-Up Menu

The Tabs Set-Up Menu displays in ruler fashion the locations of all the currently set tab stop positions (at the currently selected screen width). Each available column is numbered in repeating groups of 1 through 0 for easy location of the tab stops, which display on the screen as uppercase T's.

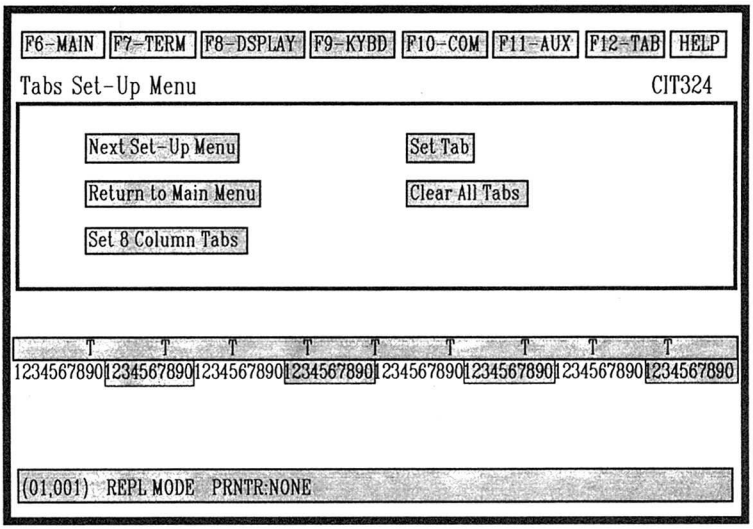

Figure 4-11. Tabs Set-Up Menu

Field: Options -- Function

Next Set-Up Menu -- Selects the next set-up screen. In this case, the next menu is the Terminal Set-Up Menu.

Return to Main Menu -- Returns the screen to the Main Set-Up Menu.

Set 8 Column Tabs -- Sets a tab every eighth column automatically, beginning with column nine.

Set Tab -- Moves the cursor into the tab ruler. Individual tabs can then be set, as explained below.

Clear All Tabs -- Clears all tab stop fields.

Individual tabs are set or reset utilizing the field cursor. Use the arrow keys or the TAB key to move the cursor. After selecting a tab stop position press the ENTER key. This places a "T" into the blank field. To remove an existing tab field, position the field cursor on the "T" and press the ENTER key. This action removes the tab stop field.

Set-Up Help Menu

Pressing the HELP key while in the set-up mode will bring up the following help menu. The Set-Up Help Menu lists the function key shortcuts which can be used to access the various set-up screens. Pressing any of the listed F-keys will take you to the indicated set-up screen.

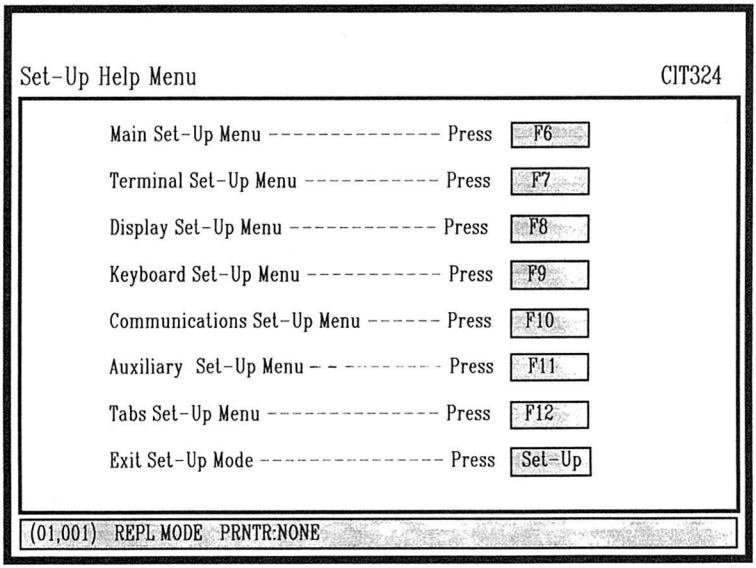
Set-Up Help Menu
CIT324
Main Set-Up Menu ---------- Press F6
Terminal Set-Up Menu ---------- Press F7
Display Set-Up Menu ---------- Press F8
Keyboard Set-Up Menu ---------- Press F9
Communications Set-Up Menu ------ Press F10
Auxiliary Set-Up Menu - - ---------- Press F11
Tabs Set-Up Menu ---------- Press F12
Exit Set-Up Mode ---------- Press Set-Up
(01,001) REPL MODE PRNTR:NONE

Figure 4-12. Set-Up Help Menu

Programmable Key Editor

The Programmable Key Editor allows local programming of the terminal's F6 through F20 function keys (F-keys). Pressing an F-key with CTRL and/or SHIFT while the terminal is in the Set-Up mode accesses the editor page.

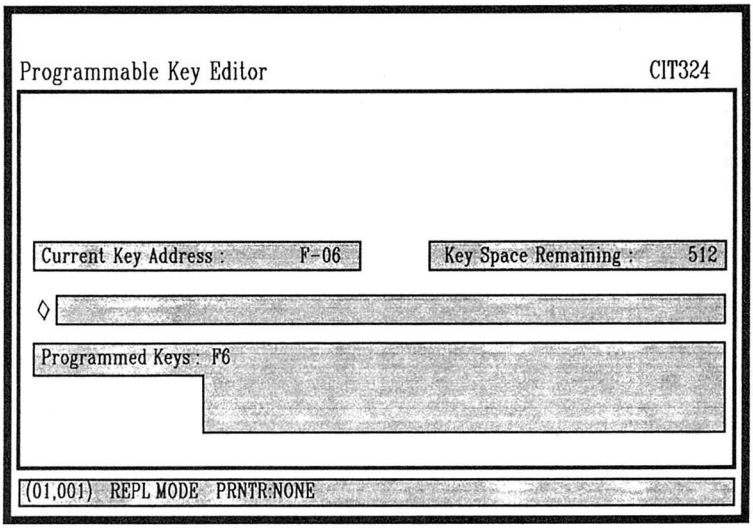

Figure 4-13. Programmable Key Editor Menu

Field: Options -- Function

Current Key Address -- Identifies the current key being loaded.

Key Space Remaining -- Identifies the number of bytes available in the entire function key storage area. The field is automatically incremented or decremented as editing take place.

Current Key Content -- Displays the contents of the function key selected within an 80 column display field. All data including control codes are displayed. Blinking plus signs (+) at the field boundaries indicates that additional data exists off the screen.

Programmed Keys -- Lists other keys currently having programmed sequences.

Operation of programmable Key Editor

In Set-Up mode the three levels of the user-defined keys are accessed as follows:

Press SHIFT key	(Keys F6 - F20)
Press CTRL F-key	(Keys F21 - F35)
Press CTRL SHIFT F-key	(Keys F36 - F50)

- The editor page displays the cursor on the left margin of the editor line. If an undefined key is being defined, the editor line is blank. If a defined key is being edited, the current contents of the key are displayed.

- The right (→) or left arrow (←) key moves the cursor within the editor window. In the event that the contents of the key are longer than the display window, a blinking '+' symbol appears at the right margin. Continued action of the cursor at the margin causes the window to scroll to bring the additional data into view.

- The window display may be advanced to the end of the string, in either direction, by the use of the CTRL and the right (→) or left arrow (←) keys.

- Note that the editor feature is always in an insert mode of operation. Placing the cursor at a position within a text string causes new characters to be inserted.

- Delete functions are managed by the <x] (DELETE) key. Pressing the <X] (DELETE) key causes the character to the left of the cursor to be deleted. Pressing the SHIFT key and the DELETE key causes the character under the cursor to be deleted. Pressing the CTRL key and the DELETE key causes the entire key contents to be deleted.

- The end of a key sequence is indicated by a blinking '◊' (diamond) symbol. When an empty key is selected, the blinking '◊' is displayed at the left margin of the editor window.

- The next function key to be defined is accessed by pressing the appropriate key combination (i.e. CTRL F6 accesses key F21). Action of the SHIFT up-arrow (↑) or SHIFT down-arrow (↓) increments or decrements the current key address field by one.

- To exit the editor page, press the ENTER key. The screen returns to its last displayed Set-Up menu. Pressing the SET-UP key also exits the editor page and Set-Up mode. The screen returns to its previous on-line or local operation.

The number of available bytes remaining in the memory is always displayed in the "Key Space Remaining" field. If the space is exhausted, a bell sounds on each attempt to enter new data. At this point, you may delete the contents of the key to allocate additional space, or exit the program with all space consumed.

User-defined keys that are loaded through the editor page are saved in NVR if "Programmable Keys : Non-Volatile" is selected in the Keyboard Enhancements Menu. Optionally, the keys may be protected from the host overwrite by the "Programmable Keys : Locked" selection in the Keyboard Enhancements Menu.

CHAPTER 5

TROUBLESHOOTING

SELF-TEST DIAGNOSTICS

The CIT324 contains self-test diagnostic firmware which may be used to verify terminal operation and to assist in isolating malfunctions. The basic self-test is automatically performed whenever the terminal is turned on or reset. Diagnostic tests may be initiated either by the operator or the host computer.

Specific self-tests are initiated by receiving the control sequence:

CSI 4;Ps;Ps;....y

Where 'Ps' is a parameter chosen for the desired test as follows:

Parameter	Functions Tested
0	All test
1	Power-up self-test
2	COMM RS-232 Port loop back test
3	AUX Port loop back test
6	COMM RS-232 Port modem control lines loop back test
7	COMM RS-423 Port loop back test
9	Repeats the tests in the string

ERROR MESSAGES

The diagnostics indicate detected errors in the form of an on-screen message. At the same time, a coded message is provided by three of the LED indicators (HOLD SCREEN, CAPS LOCK and COMPOSE), if an error is detected in the power-up self-test.

The LED error codes are as follows:

Keyboard Indicator	Problem
HOLD SCREEN LED	Blinks if ROM error
CAPS LOCK LED	Blinks if RAM error
COMPOSE LED	Blinks if NVR error

SCREEN ALIGNMENT

Fill Screen with E's	ESC # 8
Fill Screen with Character Assortment	ESC # 9

The first control sequence fills the display with the uppercase E character, while the second control sequence repeats an assortment of characters utilizing a variety of character attributes. These commands are used for alignment and test purposes.

APPENDIX A

CODE TABLES

ROW	COLUMN 0	1	2	3	4	5	6	7
0	NUL 00 00	DLE 16 10	SP 32 20	0 48 30	@ 64 40	P 80 50	` 96 60	p 112 70
1	SOH 01 01	DC1 (XON) 17 11	! 33 21	1 49 31	A 65 41	Q 81 51	a 97 61	q 113 71
2	STX 02 02	DC2 18 12	" 34 22	2 50 32	B 66 42	R 82 52	b 98 62	r 114 72
3	ETX 03 03	DC3 (XOFF) 19 13	# 35 23	3 51 33	C 67 43	S 83 53	c 99 63	s 115 73
4	EOT 04 04	DC4 20 14	$ 36 24	4 52 34	D 68 44	T 84 54	d 100 64	t 116 74
5	ENQ 05 05	NAK 21 15	% 37 25	5 53 35	E 69 45	U 85 55	e 101 65	u 117 75
6	ACK 06 06	SYN 22 16	& 38 26	6 54 36	F 70 46	V 86 56	f 102 66	v 118 76
7	BEL 07 07	ETB 23 17	' 39 27	7 55 37	G 71 47	W 87 57	g 103 67	w 119 77
8	BS 08 08	CAN 24 18	(40 28	8 56 38	H 72 48	X 88 58	h 104 68	x 120 78
9	HT 09 09	EM 25 19	) 41 29	9 57 39	I 73 49	Y 89 59	i 105 69	y 121 79
10	LF 10 0A	SUB 26 1A	* 42 2A	: 58 3A	J 74 4A	Z 90 5A	j 106 6A	z 122 7A
11	VT 11 0B	ESC 27 1B	+ 43 2B	; 59 3B	K 75 4B	[91 5B	k 107 6B	{ 123 7B
12	FF 12 0C	FS 28 1C	, 44 2C	< 60 3C	L 76 4C	\ 92 5C	l 108 6C	| 124 7C
13	CR 13 0D	GS 29 1D	- 45 2D	= 61 3D	M 77 4D	] 93 5D	m 109 6D	} 125 7D
14	SO 14 0E	RS 30 1E	. 46 2E	> 62 3E	N 78 4E	^ 94 5E	n 110 6E	~ 126 7E
15	SI 15 0F	US 31 1F	/ 47 2F	? 63 3F	O 79 4F	_ 95 5F	o 111 6F	DEL 127 7F

C0 CODES — GL CODES

KEY

Character: # — 35 (Decimal), 23 (Hexadecimal)

Table A-1. 7-Bit Code Table
(ASCII Graphics)

COLUMN																
8		9		10		11		12		13		14		15		ROW
	128 80	DCS	144 90		160 A0	°	176 B0	À	192 C0		208 D0	à	224 E0		240 F0	0
	129 81	PU1	145 91	¡	161 A1	±	177 B1	Á	193 C1	Ñ	209 D1	á	225 E1	ñ	241 F1	1
	130 82	PU2	146 92	¢	162 A2	2	178 B2	Â	194 C2	Ò	210 D2	â	226 E2	ò	242 F2	2
	131 83	STS	147 93	£	163 A3	3	179 B3	Ã	195 C3	Ó	211 D3	ã	227 E3	ó	243 F3	3
IND	132 84	CCH	148 94		164 A4		180 B4	Ä	196 C4	Ô	212 D4	ä	228 E4	ô	244 F4	4
NEL	133 85	MW	149 95	¥	165 A5	µ	181 B5	Å	197 C5	Õ	213 D5	å	229 E5	õ	245 F5	5
SSA	134 86	SPA	150 96		166 A6	¶	182 B6	Æ	198 C6	Ö	214 D6	æ	230 E6	ö	246 F6	6
ESA	135 87	EPA	151 97	§	167 A7	·	183 B7	Ç	199 C7	Œ	215 D7	ç	231 E7	œ	247 F7	7
HTS	136 88		152 98	¤	168 A8		184 B8	È	200 C8	Ø	216 D8	è	232 E8	ø	248 F8	8
HTJ	137 89		153 99	©	169 A9	¹	185 B9	É	201 C9	Ù	217 D9	é	233 E9	ù	249 F9	9
VTS	138 8A		154 9A	ª	170 AA	º	186 BA	Ê	202 CA	Ú	218 DA	ê	234 EA	ú	250 FA	10
PLD	139 8B	CSI	155 9B	«	171 AB	»	187 BB	Ë	203 CB	Û	219 DB	ë	235 EB	û	251 FB	11
PLU	140 8C	ST	156 9C		172 AC	¼	188 BC	Ì	204 CC	Ü	220 DC	ì	236 EC	ü	252 FC	12
RI	141 8D	OSC	157 9D		173 AD	½	189 BD	Í	205 CD	Ÿ	221 DD	í	237 ED	ÿ	253 FD	13
SS2	142 8E	PM	158 9E		174 AE		190 BE	Î	206 CE		222 DE	î	238 EE		254 FE	14
SS3	143 8F	APC	159 9F		175 AF	¿	191 BF	Ï	207 CF	ß	223 DF	ï	239 EF		255 FF	15

C1 CODES — GR CODES

KEY

Character: æ — 230 (Decimal) / E6 (Hexadecimal)

Table A-2. 8-Bit Code Table
(DEC Supplemental Graphics)

COLUMN																	
8		9		10		11		12		13		14		15			
	128 80	DCS	144 90	NBSP	160 A0	°	176 B0	À	192 C0	Ð	208 D0	à	224 E0	ð	240 F0	0	ROW
	129 81	PU1	145 91	¡	161 A1	±	177 B1	Á	193 C1	Ñ	209 D1	á	225 E1	ñ	241 F1	1	
	130 82	PU2	146 92	¢	162 A2	2	178 B2	Â	194 C2	Ò	210 D2	â	226 E2	ò	242 F2	2	
	131 83	STS	147 93	£	163 A3	3	179 B3	Ã	195 C3	Ó	211 D3	ã	227 E3	ó	243 F3	3	
IND	132 84	CCH	148 94	¤	164 A4	´	180 B4	Ä	196 C4	Ô	212 D4	ä	228 E4	ô	244 F4	4	
NEL	133 85	MW	149 95	¥	165 A5	µ	181 B5	Å	197 C5	Õ	213 D5	å	229 E5	õ	245 F5	5	
SSA	134 86	SPA	150 96	¦	166 A6	¶	182 B6	Æ	198 C6	Ö	214 D6	æ	230 E6	ö	246 F6	6	
ESA	135 87	EPA	151 97	§	167 A7	·	183 B7	Ç	199 C7	×	215 D7	ç	231 E7	÷	247 F7	7	
HTS	136 88		152 98	¨	168 A8		184 B8	È	200 C8	Ø	216 D8	è	232 E8	ø	248 F8	8	
HTJ	137 89		153 99	©	169 A9	1	185 B9	É	201 C9	Ù	217 D9	é	233 E9	ù	249 F9	9	
VTS	138 8A		154 9A	ª	170 AA	º	186 BA	Ê	202 CA	Ú	218 DA	ê	234 EA	ú	250 FA	10	
PLD	139 8B	CSI	155 9B	«	171 AB	»	187 BB	Ë	203 CB	Û	219 DB	ë	235 EB	û	251 FB	11	
PLU	140 8C	ST	156 9C	¬	172 AC	¼	188 BC	Ì	204 CC	Ü	220 DC	ì	236 EC	ü	252 FC	12	
RI	141 8D	OSC	157 9D	—	173 AD	½	189 BD	Í	205 CD	Ý	221 DD	í	237 ED	ý	253 FD	13	
SS2	142 8E	PM	158 9E	®	174 AE	¾	190 BE	Î	206 CE	Þ	222 DE	î	238 EE	þ	254 FE	14	
SS3	143 8F	APC	159 9F	¯	175 AF	¿	191 BF	Ï	207 CF	ß	223 DF	ï	239 EF	ÿ	255 FF	15	

C1 CODES — GR CODES

KEY

Character: æ | 230 Decimal | E6 Hexadecimal

Table A-3. 8-Bit Code Table
(ISO Latin-1 Supplemental Graphics)

ROW	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
0	NUL	00 00	DLE	16 10	SP	32 20	0	48 30	@	64 40	P	80 50	♦	96 60	— SCAN3	112 70
1	SOH	01 01	DC1 (XON)	17 11	!	33 21	1	49 31	A	65 41	Q	81 51	▮	97 61	— SCAN5	113 71
2	STX	02 02	DC2	18 12	"	34 22	2	50 32	B	66 42	R	82 52	H_T	98 62	SCAN7 —	114 72
3	ETX	03 03	DC3 (XOFF)	19 13	#	35 23	3	51 33	C	67 43	S	83 53	F_F	99 63	SCAN9 —	115 73
4	EOT	04 04	DC4	20 14	$	36 24	4	52 34	D	68 44	T	84 54	C_R	100 64	├	116 74
5	ENQ	05 05	NAK	21 15	%	37 25	5	53 35	E	69 45	U	85 55	L_F	101 65	┤	117 75
6	ACK	06 06	SYN	22 16	&	38 26	6	54 36	F	70 46	V	86 56	°	102 66	┴	118 76
7	BEL	07 07	ETB	23 17	'	39 27	7	55 37	G	71 47	W	87 57	±	103 67	┬	119 77
8	BS	08 08	CAN	24 18	(	40 28	8	56 38	H	72 48	X	88 58	N_L	104 68	│	120 78
9	HT	09 09	EM	25 19	)	41 29	9	57 39	I	73 49	Y	89 59	V_T	105 69	≤	121 79
10	LF	10 0A	SUB	26 1A	*	42 2A	:	58 3A	J	74 4A	Z	90 5A	┘	106 6A	≥	122 7A
11	VT	11 0B	ESC	27 1B	+	43 2B	;	59 3B	K	75 4B	[	91 5B	┐	107 6B	π	123 7B
12	FF	12 0C	FS	28 1C	,	44 2C	<	60 3C	L	76 4C	\	92 5C	┌	108 6C	≠	124 7C
13	CR	13 0D	GS	29 1D	-	45 2D	=	61 3D	M	77 4D	]	93 5D	└	109 6D	£	125 7D
14	SO	14 0E	RS	30 1E	.	46 2E	>	62 3E	N	78 4E	^	94 5E	┼	110 6E	•	126 7E
15	SI	15 0F	US	31 1F	/	47 2F	?	63 3F	O	79 4F	(BLANK)	95 5F	— SCAN1	111 6F	DEL	127 7F

C0 CODES — GL CODES

KEY

Character: # — 35 (Decimal), 23 (Hexadecimal)

Table A-4. Special Graphics

ROW	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
0	NUL	00 00	DLE	16 10	SP	32 20	0	48 30	@	64 40	P	80 50	`	96 60	p	112 70
1	SOH	01 01	DC1 (XON)	17 11	!	33 21	1	49 31	A	65 41	Q	81 51	a	97 61	q	113 71
2	STX	02 02	DC2	18 12	"	34 22	2	50 32	B	66 42	R	82 52	b	98 62	r	114 72
3	ETX	03 03	DC3 (XOFF)	19 13	£	35 23	3	51 33	C	67 43	S	83 53	c	99 63	s	115 73
4	EOT	04 04	DC4	20 14	$	36 24	4	52 34	D	68 44	T	84 54	d	100 64	t	116 74
5	ENQ	05 05	NAK	21 15	%	37 25	5	53 35	E	69 45	U	85 55	e	101 65	u	117 75
6	ACK	06 06	SYN	22 16	&	38 26	6	54 36	F	70 46	V	86 56	f	102 66	v	118 76
7	BEL	07 07	ETB	23 17	'	39 27	7	55 37	G	71 47	W	87 57	g	103 67	w	119 77
8	BS	08 08	CAN	24 18	(	40 28	8	56 38	H	72 48	X	88 58	h	104 68	x	120 78
9	HT	09 09	EM	25 19	)	41 29	9	57 39	I	73 49	Y	89 59	i	105 69	y	121 79
10	LF	10 0A	SUB	26 1A	*	42 2A	:	58 3A	J	74 4A	Z	90 5A	j	106 6A	z	122 7A
11	VT	11 0B	ESC	27 1B	+	43 2B	;	59 3B	K	75 4B	[	91 5B	k	107 6B	{	123 7B
12	FF	12 0C	FS	28 1C	,	44 2C	<	60 3C	L	76 4C	\	92 5C	l	108 6C	|	124 7C
13	CR	13 0D	GS	29 1D	-	45 2D	=	61 3D	M	77 4D	]	93 5D	m	109 6D	}	125 7D
14	SO	14 0E	RS	30 1E	.	46 2E	>	62 3E	N	78 4E	^	94 5E	n	110 6E	~	126 7E
15	SI	15 0F	US	31 1F	/	47 2F	?	63 3F	O	79 4F	_	95 5F	o	111 6F	DEL	127 7F

C0 CODES — GL CODES

KEY

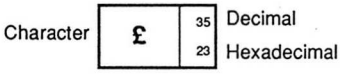

Table A-5. British NRC Set
(British Keyboard)

ROW	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
0	NUL	00 00	DLE	16 10	SP	32 20	0	48 30	à	64 40	P	80 50	`	96 60	p	112 70
1	SOH	01 01	DC1 (XON)	17 11	!	33 21	1	49 31	A	65 41	Q	81 51	a	97 61	q	113 71
2	STX	02 02	DC2	18 12	"	34 22	2	50 32	B	66 42	R	82 52	b	98 62	r	114 72
3	ETX	03 03	DC3 (XOFF)	19 13	£	35 23	3	51 33	C	67 43	S	83 53	c	99 63	s	115 73
4	EOT	04 04	DC4	20 14	$	36 24	4	52 34	D	68 44	T	84 54	d	100 64	t	116 74
5	ENQ	05 05	NAK	21 15	%	37 25	5	53 35	E	69 45	U	85 55	e	101 65	u	117 75
6	ACK	06 06	SYN	22 16	&	38 26	6	54 36	F	70 46	V	86 56	f	102 66	v	118 76
7	BEL	07 07	ETB	23 17	'	39 27	7	55 37	G	71 47	W	87 57	g	103 67	w	119 77
8	BS	08 08	CAN	24 18	(	40 28	8	56 38	H	72 48	X	88 58	h	104 68	x	120 78
9	HT	09 09	EM	25 19	)	41 29	9	57 39	I	73 49	Y	89 59	i	105 69	y	121 79
10	LF	10 0A	SUB	26 1A	*	42 2A	:	58 3A	J	74 4A	Z	90 5A	j	106 6A	z	122 7A
11	VT	11 0B	ESC	27 1B	+	43 2B	;	59 3B	K	75 4B	°	91 5B	k	107 6B	é	123 7B
12	FF	12 0C	FS	28 1C	,	44 2C	<	60 3C	L	76 4C	ç	92 5C	l	108 6C	ù	124 7C
13	CR	13 0D	GS	29 1D	-	45 2D	=	61 3D	M	77 4D	§	93 5D	m	109 6D	è	125 7D
14	SO	14 0E	RS	30 1E	.	46 2E	>	62 3E	N	78 4E	^	94 5E	n	110 6E	"	126 7E
15	SI	15 0F	US	31 1F	/	47 2F	?	63 3F	O	79 4F	_	95 5F	o	111 6F	DEL	127 7F

C0 CODES — GL CODES

KEY

Character: § — 93 Decimal, 5D Hexadecimal

Table A-6. French NRC Set
(Flemish and French/Belgian Keyboards)

ROW	COLUMN 0			COLUMN 1			COLUMN 2			COLUMN 3			COLUMN 4			COLUMN 5			COLUMN 6			COLUMN 7		
0	NUL	00 00		DLE	16 10		SP	32 20		0	48 30		à	64 40		P	80 50		ô	96 60		p	112 70	
1	SOH	01 01		DC1 (XON)	17 11		!	33 21		1	49 31		A	65 41		Q	81 51		a	97 61		q	113 71	
2	STX	02 02		DC2	18 12		"	34 22		2	50 32		B	66 42		R	82 52		b	98 62		r	114 72	
3	ETX	03 03		DC3 (XOFF)	19 13		#	35 23		3	51 33		C	67 43		S	83 53		c	99 63		s	115 73	
4	EOT	04 04		DC4	20 14		$	36 24		4	52 34		D	68 44		T	84 54		d	100 64		t	116 74	
5	ENQ	05 05		NAK	21 15		%	37 25		5	53 35		E	69 45		U	85 55		e	101 65		u	117 75	
6	ACK	06 06		SYN	22 16		&	38 26		6	54 36		F	70 46		V	86 56		f	102 66		v	118 76	
7	BEL	07 07		ETB	23 17		'	39 27		7	55 37		G	71 47		W	87 57		g	103 67		w	119 77	
8	BS	08 08		CAN	24 18		(	40 28		8	56 38		H	72 48		X	88 58		h	104 68		x	120 78	
9	HT	09 09		EM	25 19		)	41 29		9	57 39		I	73 49		Y	89 59		i	105 69		y	121 79	
10	LF	10 0A		SUB	26 1A		*	42 2A		:	58 3A		J	74 4A		Z	90 5A		j	106 6A		z	122 7A	
11	VT	11 0B		ESC	27 1B		+	43 2B		;	59 3B		K	75 4B		â	91 5B		k	107 6B		é	123 7B	
12	FF	12 0C		FS	28 1C		,	44 2C		<	60 3C		L	76 4C		ç	92 5C		l	108 6C		ù	124 7C	
13	CR	13 0D		GS	29 1D		-	45 2D		=	61 3D		M	77 4D		ê	93 5D		m	109 6D		è	125 7D	
14	SO	14 0E		RS	30 1E		.	46 2E		>	62 3E		N	78 4E		î	94 5E		n	110 6E		û	126 7E	
15	SI	15 0F		US	31 1F		/	47 2F		?	63 3F		O	79 4F		_	95 5F		o	111 6F		DEL	127 7F	

C0 CODES — GL CODES

KEY

Character: ç | 92 (Decimal) / 5C (Hexadecimal)

Table A-7. French Canadian NRC Set
(French Canadian Keyboard)

ROW	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
0	NUL	00 00	DLE	16 10	SP	32 20	0	48 30	@	64 40	P	80 50	ă	96 60	p	112 70
1	SOH	01 01	DC1 (XON)	17 11	!	33 21	1	49 31	A	65 41	Q	81 51	a	97 61	q	113 71
2	STX	02 02	DC2	18 12	"	34 22	2	50 32	B	66 42	R	82 52	b	98 62	r	114 72
3	ETX	03 03	DC3 (XOFF)	19 13	#	35 23	3	51 33	C	67 43	S	83 53	c	99 63	s	115 73
4	EOT	04 04	DC4	20 14	$	36 24	4	52 34	D	68 44	T	84 54	d	100 64	t	116 74
5	ENQ	05 05	NAK	21 15	%	37 25	5	53 35	E	69 45	U	85 55	e	101 65	u	117 75
6	ACK	06 06	SYN	22 16	&	38 26	6	54 36	F	70 46	V	86 56	f	102 66	v	118 76
7	BEL	07 07	ETB	23 17	'	39 27	7	55 37	G	71 47	W	87 57	g	103 67	w	119 77
8	BS	08 08	CAN	24 18	(	40 28	8	56 38	H	72 48	X	88 58	h	104 68	x	120 78
9	HT	09 09	EM	25 19	)	41 29	9	57 39	I	73 49	Y	89 59	i	105 69	y	121 79
10	LF	10 0A	SUB	26 1A	*	42 2A	:	58 3A	J	74 4A	Z	90 5A	j	106 6A	z	122 7A
11	VT	11 0B	ESC	27 1B	+	43 2B	;	59 3B	K	75 4B	Æ	91 5B	k	107 6B	æ	123 7B
12	FF	12 0C	FS	28 1C	,	44 2C	<	60 3C	L	76 4C	Ø	92 5C	l	108 6C	ø	124 7C
13	CR	13 0D	GS	29 1D	-	45 2D	=	61 3D	M	77 4D	Å	93 5D	m	109 6D	å	125 7D
14	SO	14 0E	RS	30 1E	.	46 2E	>	62 3E	N	78 4E	^	94 5E	n	110 6E	~	126 7E
15	SI	15 0F	US	31 1F	/	47 2F	?	63 3F	O	79 4F	_	95 5F	o	111 6F	DEL	127 7F

C0 CODES — GL CODES

KEY

Character: Æ — 91 (Decimal) / 5B (Hexadecimal)

Table A-8. Norwegian/Danish NRC Set
(Norwegian and Danish Keyboards)

ROW	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
0	NUL	00 00	DLE	16 10	SP	32 20	0	48 30	@	64 40	P	80 50	é	96 60	p	112 70
1	SOH	01 01	DC1 (XON)	17 11	!	33 21	1	49 31	A	65 41	Q	81 51	a	97 61	q	113 71
2	STX	02 02	DC2	18 12	"	34 22	2	50 32	B	66 42	R	82 52	b	98 62	r	114 72
3	ETX	03 03	DC3 (XOFF)	19 13	#	35 23	3	51 33	C	67 43	S	83 53	c	99 63	s	115 73
4	EOT	04 04	DC4	20 14	$	36 24	4	52 34	D	68 44	T	84 54	d	100 64	t	116 74
5	ENQ	05 05	NAK	21 15	%	37 25	5	53 35	E	69 45	U	85 55	e	101 65	u	117 75
6	ACK	06 06	SYN	22 16	&	38 26	6	54 36	F	70 46	V	86 56	f	102 66	v	118 76
7	BEL	07 07	ETB	23 17	'	39 27	7	55 37	G	71 47	W	87 57	g	103 67	w	119 77
8	BS	08 08	CAN	24 18	(	40 28	8	56 38	H	72 48	X	88 58	h	104 68	x	120 78
9	HT	09 09	EM	25 19	)	41 29	9	57 39	I	73 49	Y	89 59	i	105 69	y	121 79
10	LF	10 0A	SUB	26 1A	*	42 2A	:	58 3A	J	74 4A	Z	90 5A	j	106 6A	z	122 7A
11	VT	11 0B	ESC	27 1B	+	43 2B	;	59 3B	K	75 4B	Ä	91 5B	k	107 6B	ä	123 7B
12	FF	12 0C	FS	28 1C	,	44 2C	<	60 3C	L	76 4C	Ö	92 5C	l	108 6C	ö	124 7C
13	CR	13 0D	GS	29 1D	-	45 2D	=	61 3D	M	77 4D	Å	93 5D	m	109 6D	å	125 7D
14	SO	14 0E	RS	30 1E	.	46 2E	>	62 3E	N	78 4E	Ü	94 5E	n	110 6E	ü	126 7E
15	SI	15 0F	US	31 1F	/	47 2F	?	63 3F	O	79 4F	_	95 5F	o	111 6F	DEL	127 7F

C0 CODES — GL CODES

KEY

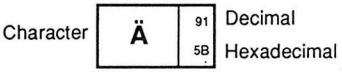

Table A-9. Finnish NRC Set
(Finnish Keyboard)

ROW	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
0	NUL	00 00	DLE	16 10	SP	32 20	0	48 30	§	64 40	P	80 50	`	96 60	p	112 70
1	SOH	01 01	DC1 (XON)	17 11	!	33 21	1	49 31	A	65 41	Q	81 51	a	97 61	q	113 71
2	STX	02 02	DC2	18 12	"	34 22	2	50 32	B	66 42	R	82 52	b	98 62	r	114 72
3	ETX	03 03	DC3 (XOFF)	19 13	#	35 23	3	51 33	C	67 43	S	83 53	c	99 63	s	115 73
4	EOT	04 04	DC4	20 14	$	36 24	4	52 34	D	68 44	T	84 54	d	100 64	t	116 74
5	ENQ	05 05	NAK	21 15	%	37 25	5	53 35	E	69 45	U	85 55	e	101 65	u	117 75
6	ACK	06 06	SYN	22 16	&	38 26	6	54 36	F	70 46	V	86 56	f	102 66	v	118 76
7	BEL	07 07	ETB	23 17	'	39 27	7	55 37	G	71 47	W	87 57	g	103 67	w	119 77
8	BS	08 08	CAN	24 18	(	40 28	8	56 38	H	72 48	X	88 58	h	104 68	x	120 78
9	HT	09 09	EM	25 19	)	41 29	9	57 39	I	73 49	Y	89 59	i	105 69	y	121 79
10	LF	10 0A	SUB	26 1A	*	42 2A	:	58 3A	J	74 4A	Z	90 5A	j	106 6A	z	122 7A
11	VT	11 0B	ESC	27 1B	+	43 2B	;	59 3B	K	75 4B	Ä	91 5B	k	107 6B	ä	123 7B
12	FF	12 0C	FS	28 1C	,	44 2C	<	60 3C	L	76 4C	Ö	92 5C	l	108 6C	ö	124 7C
13	CR	13 0D	GS	29 1D	-	45 2D	=	61 3D	M	77 4D	Ü	93 5D	m	109 6D	ü	125 7D
14	SO	14 0E	RS	30 1E	.	46 2E	>	62 3E	N	78 4E	^	94 5E	n	110 6E	ß	126 7E
15	SI	15 0F	US	31 1F	/	47 2F	?	63 3F	O	79 4F	_	95 5F	o	111 6F	DEL	127 7F

C0 CODES — GL CODES

KEY

Character: ß — 126 (Decimal) / 7E (Hexadecimal)

Table A-10. German NRC Set
(German Keyboard)

ROW	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
0	NUL	00 00	DLE	16 10	SP	32 20	0	48 30	¾	64 40	P	80 50	`	96 60	p	112 70
1	SOH	01 01	DC1 (XON)	17 11	!	33 21	1	49 31	A	65 41	Q	81 51	a	97 61	q	113 71
2	STX	02 02	DC2	18 12	"	34 22	2	50 32	B	66 42	R	82 52	b	98 62	r	114 72
3	ETX	03 03	DC3 (XOFF)	19 13	£	35 23	3	51 33	C	67 43	S	83 53	c	99 63	s	115 73
4	EOT	04 04	DC4	20 14	$	36 24	4	52 34	D	68 44	T	84 54	d	100 64	t	116 74
5	ENQ	05 05	NAK	21 15	%	37 25	5	53 35	E	69 45	U	85 55	e	101 65	u	117 75
6	ACK	06 06	SYN	22 16	&	38 26	6	54 36	F	70 46	V	86 56	f	102 66	v	118 76
7	BEL	07 07	ETB	23 17	'	39 27	7	55 37	G	71 47	W	87 57	g	103 67	w	119 77
8	BS	08 08	CAN	24 18	(	40 28	8	56 38	H	72 48	X	88 58	h	104 68	x	120 78
9	HT	09 09	EM	25 19	)	41 29	9	57 39	I	73 49	Y	89 59	i	105 69	y	121 79
10	LF	10 0A	SUB	26 1A	*	42 2A	:	58 3A	J	74 4A	Z	90 5A	j	106 6A	z	122 7A
11	VT	11 0B	ESC	27 1B	+	43 2B	;	59 3B	K	75 4B	ij	91 5B	k	107 6B	ã	123 7B
12	FF	12 0C	FS	28 1C	,	44 2C	<	60 3C	L	76 4C	½	92 5C	l	108 6C	ƒ	124 7C
13	CR	13 0D	GS	29 1D	-	45 2D	=	61 3D	M	77 4D	|	93 5D	m	109 6D	¼	125 7D
14	SO	14 0E	RS	30 1E	.	46 2E	>	62 3E	N	78 4E	^	94 5E	n	110 6E	´	126 7E
15	SI	15 0F	US	31 1F	/	47 2F	?	63 3F	O	79 4F	_	95 5F	o	111 6F	DEL	127 7F

C0 CODES — GL CODES

KEY

Character: £ — 35 (Decimal), 23 (Hexadecimal)

Table A-11. Dutch NRC Set
(Dutch Keyboard)

ROW	COLUMN 0	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7
0	NUL 00 00	DLE 16 10	SP 32 20	0 48 30	§ 64 40	P 80 50	ù 96 60	p 112 70
1	SOH 01 01	DC1 (XON) 17 11	! 33 21	1 49 31	A 65 41	Q 81 51	a 97 61	q 113 71
2	STX 02 02	DC2 18 12	" 34 22	2 50 32	B 66 42	R 82 52	b 98 62	r 114 72
3	ETX 03 03	DC3 (XOFF) 19 13	£ 35 23	3 51 33	C 67 43	S 83 53	c 99 63	s 115 73
4	EOT 04 04	DC4 20 14	$ 36 24	4 52 34	D 68 44	T 84 54	d 100 64	t 116 74
5	ENQ 05 05	NAK 21 15	% 37 25	5 53 35	E 69 45	U 85 55	e 101 65	u 117 75
6	ACK 06 06	SYN 22 16	& 38 26	6 54 36	F 70 46	V 86 56	f 102 66	v 118 76
7	BEL 07 07	ETB 23 17	' 39 27	7 55 37	G 71 47	W 87 57	g 103 67	w 119 77
8	BS 08 08	CAN 24 18	(40 28	8 56 38	H 72 48	X 88 58	h 104 68	x 120 78
9	HT 09 09	EM 25 19	) 41 29	9 57 39	I 73 49	Y 89 59	i 105 69	y 121 79
10	LF 10 0A	SUB 26 1A	* 42 2A	: 58 3A	J 74 4A	Z 90 5A	j 106 6A	z 122 7A
11	VT 11 0B	ESC 27 1B	+ 43 2B	; 59 3B	K 75 4B	° 91 5B	k 107 6B	à 123 7B
12	FF 12 0C	FS 28 1C	, 44 2C	< 60 3C	L 76 4C	ç 92 5C	l 108 6C	ò 124 7C
13	CR 13 0D	GS 29 1D	- 45 2D	= 61 3D	M 77 4D	é 93 5D	m 109 6D	è 125 7D
14	SO 14 0E	RS 30 1E	. 46 2E	> 62 3E	N 78 4E	^ 94 5E	n 110 6E	ì 126 7E
15	SI 15 0F	US 31 1F	/ 47 2F	? 63 3F	O 79 4F	_ 95 5F	o 111 6F	DEL 127 7F

C0 CODES — GL CODES

KEY

Character: £ — 35 Decimal, 23 Hexadecimal

Table A-12. Italian NRC Set
(Italian Keyboard)

ROW	COLUMN 0		1		2		3		4		5		6		7	
0	NUL	00 00	DLE	16 10	SP	32 20	0	48 30	à	64 40	P	80 50	ô	96 60	p	112 70
1	SOH	01 01	DC1 (XON)	17 11	!	33 21	1	49 31	A	65 41	Q	81 51	a	97 61	q	113 71
2	STX	02 02	DC2	18 12	"	34 22	2	50 32	B	66 42	R	82 52	b	98 62	r	114 72
3	ETX	03 03	DC3 (XOFF)	19 13	ù	35 23	3	51 33	C	67 43	S	83 53	c	99 63	s	115 73
4	EOT	04 04	DC4	20 14	$	36 24	4	52 34	D	68 44	T	84 54	d	100 64	t	116 74
5	ENQ	05 05	NAK	21 15	%	37 25	5	53 35	E	69 45	U	85 55	e	101 65	u	117 75
6	ACK	06 06	SYN	22 16	&	38 26	6	54 36	F	70 46	V	86 56	f	102 66	v	118 76
7	BEL	07 07	ETB	23 17	'	39 27	7	55 37	G	71 47	W	87 57	g	103 67	w	119 77
8	BS	08 08	CAN	24 18	(	40 28	8	56 38	H	72 48	X	88 58	h	104 68	x	120 78
9	HT	09 09	EM	25 19	)	41 29	9	57 39	I	73 49	Y	89 59	i	105 69	y	121 79
10	LF	10 0A	SUB	26 1A	*	42 2A	:	58 3A	J	74 4A	Z	90 5A	j	106 6A	z	122 7A
11	VT	11 0B	ESC	27 1B	+	43 2B	;	59 3B	K	75 4B	é	91 5B	k	107 6B	ä	123 7B
12	FF	12 0C	FS	28 1C	,	44 2C	<	60 3C	L	76 4C	ç	92 5C	l	108 6C	ö	124 7C
13	CR	13 0D	GS	29 1D	-	45 2D	=	61 3D	M	77 4D	ê	93 5D	m	109 6D	ü	125 7D
14	SO	14 0E	RS	30 1E	.	46 2E	>	62 3E	N	78 4E	î	94 5E	n	110 6E	û	126 7E
15	SI	15 0F	US	31 1F	/	47 2F	?	63 3F	O	79 4F	è	95 5F	o	111 6F	DEL	127 7F

C0 CODES — GL CODES

KEY

Character: ù — 35 Decimal, 23 Hexadecimal

Table A-13. Swiss NRC Set
(Swiss/French and Swiss/German Keyboards)

ROW	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
0	NUL	00 00	DLE	16 10	SP	32 20	0	48 30	É	64 40	P	80 50	é	96 60	p	112 70
1	SOH	01 01	DC1 (XON)	17 11	!	33 21	1	49 31	A	65 41	Q	81 51	a	97 61	q	113 71
2	STX	02 02	DC2	18 12	"	34 22	2	50 32	B	66 42	R	82 52	b	98 62	r	114 72
3	ETX	03 03	DC3 (XOFF)	19 13	#	35 23	3	51 33	C	67 43	S	83 53	c	99 63	s	115 73
4	EOT	04 04	DC4	20 14	$	36 24	4	52 34	D	68 44	T	84 54	d	100 64	t	116 74
5	ENQ	05 05	NAK	21 15	%	37 25	5	53 35	E	69 45	U	85 55	e	101 65	u	117 75
6	ACK	06 06	SYN	22 16	&	38 26	6	54 36	F	70 46	V	86 56	f	102 66	v	118 76
7	BEL	07 07	ETB	23 17	'	39 27	7	55 37	G	71 47	W	87 57	g	103 67	w	119 77
8	BS	08 08	CAN	24 18	(	40 28	8	56 38	H	72 48	X	88 58	h	104 68	x	120 78
9	HT	09 09	EM	25 19	)	41 29	9	57 39	I	73 49	Y	89 59	i	105 69	y	121 79
10	LF	10 0A	SUB	26 1A	*	42 2A	:	58 3A	J	74 4A	Z	90 5A	j	106 6A	z	122 7A
11	VT	11 0B	ESC	27 1B	+	43 2B	;	59 3B	K	75 4B	Ä	91 5B	k	107 6B	ä	123 7B
12	FF	12 0C	FS	28 1C	,	44 2C	<	60 3C	L	76 4C	Ö	92 5C	l	108 6C	ö	124 7C
13	CR	13 0D	GS	29 1D	-	45 2D	=	61 3D	M	77 4D	Å	93 5D	m	109 6D	å	125 7D
14	SO	14 0E	RS	30 1E	.	46 2E	>	62 3E	N	78 4E	Ü	94 5E	n	110 6E	ü	126 7E
15	SI	15 0F	US	31 1F	/	47 2F	?	63 3F	O	79 4F	_	95 5F	o	111 6F	DEL	127 7F

C0 CODES — GL CODES

KEY

Character: É — 64 (Decimal), 40 (Hexadecimal)

Table A-14. Swedish NRC Set
(Swedish Keyboard)

ROW	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
0	NUL	00 00	DLE	16 10	SP	32 20	0	48 30	§	64 40	P	80 50	`	96 60	p	112 70
1	SOH	01 01	DC1 (XON)	17 11	!	33 21	1	49 31	A	65 41	Q	81 51	a	97 61	q	113 71
2	STX	02 02	DC2	18 12	"	34 22	2	50 32	B	66 42	R	82 52	b	98 62	r	114 72
3	ETX	03 03	DC3 (XOFF)	19 13	£	35 23	3	51 33	C	67 43	S	83 53	c	99 63	s	115 73
4	EOT	04 04	DC4	20 14	$	36 24	4	52 34	D	68 44	T	84 54	d	100 64	t	116 74
5	ENQ	05 05	NAK	21 15	%	37 25	5	53 35	E	69 45	U	85 55	e	101 65	u	117 75
6	ACK	06 06	SYN	22 16	&	38 26	6	54 36	F	70 46	V	86 56	f	102 66	v	118 76
7	BEL	07 07	ETB	23 17	'	39 27	7	55 37	G	71 47	W	87 57	g	103 67	w	119 77
8	BS	08 08	CAN	24 18	(	40 28	8	56 38	H	72 48	X	88 58	h	104 68	x	120 78
9	HT	09 09	EM	25 19	)	41 29	9	57 39	I	73 49	Y	89 59	i	105 69	y	121 79
10	LF	10 0A	SUB	26 1A	*	42 2A	:	58 3A	J	74 4A	Z	90 5A	j	106 6A	z	122 7A
11	VT	11 0B	ESC	27 1B	+	43 2B	;	59 3B	K	75 4B	¡	91 5B	k	107 6B	`	123 7B
12	FF	12 0C	FS	28 1C	,	44 2C	<	60 3C	L	76 4C	Ñ	92 5C	l	108 6C	o	124 7C
13	CR	13 0D	GS	29 1D	-	45 2D	=	61 3D	M	77 4D	¿	93 5D	m	109 6D	ñ	125 7D
14	SO	14 0E	RS	30 1E	.	46 2E	>	62 3E	N	78 4E	^	94 5E	n	110 6E	Ç	126 7E
15	SI	15 0F	US	31 1F	/	47 2F	?	63 3F	O	79 4F	_	95 5F	o	111 6F	DEL	127 7F

C0 CODES — GL CODES

KEY

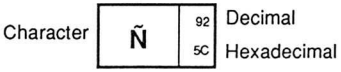

Table A-15. Spanish NRC Set
(Spanish Keyboard)

ROW	COLUMN 0				COLUMN 1				COLUMN 2				COLUMN 3				COLUMN 4				COLUMN 5				COLUMN 6				COLUMN 7			
	0	NUL	00	00	DLE	16	10	SP	32	20	0	48	30	@	64	40	P	80	50	`	96	60	p	112	70
	1	SOH	01	01	DC1 (XON)	17	11	!	33	21	1	49	31	A	65	41	Q	81	51	a	97	61	q	113	71
	2	STX	02	02	DC2	18	12	"	34	22	2	50	32	B	66	42	R	82	52	b	98	62	r	114	72
	3	ETX	03	03	DC3 (XOFF)	19	13	#	35	23	3	51	33	C	67	43	S	83	53	c	99	63	s	115	73
	4	EOT	04	04	DC4	20	14	$	36	24	4	52	34	D	68	44	T	84	54	d	100	64	t	116	74
	5	ENQ	05	05	NAK	21	15	%	37	25	5	53	35	E	69	45	U	85	55	e	101	65	u	117	75
	6	ACK	06	06	SYN	22	16	&	38	26	6	54	36	F	70	46	V	86	56	f	102	66	v	118	76
	7	BEL	07	07	ETB	23	17	'	39	27	7	55	37	G	71	47	W	87	57	g	103	67	w	119	77
	8	BS	08	08	CAN	24	18	(	40	28	8	56	38	H	72	48	X	88	58	h	104	68	x	120	78
	9	HT	09	09	EM	25	19	)	41	29	9	57	39	I	73	49	Y	89	59	i	105	69	y	121	79
	10	LF	10	0A	SUB	26	1A	*	42	2A	:	58	3A	J	74	4A	Z	90	5A	j	106	6A	z	122	7A
	11	VT	11	0B	ESC	27	1B	+	43	2B	;	59	3B	K	75	4B	Ã	91	5B	k	107	6B	ã	123	7B
	12	FF	12	0C	FS	28	1C	,	44	2C	<	60	3C	L	76	4C	Ç	92	5C	l	108	6C	Ç	124	7C
	13	CR	13	0D	GS	29	1D	-	45	2D	=	61	3D	M	77	4D	Õ	93	5D	m	109	6D	õ	125	7D
	14	SO	14	0E	RS	30	1E	.	46	2E	>	62	3E	N	78	4E	^	94	5E	n	110	6E	~	126	7E
	15	SI	15	0F	US	31	1F	/	47	2F	?	63	3F	O	79	4F	_	95	5F	o	111	6F	DEL	127	7F

C0 CODES — GL CODES

KEY

Character: # — 35 Decimal / 23 Hexadecimal

Table A-16. Portuguese NRC Set
(Portuguese Keyboard)

APPENDIX B

KEYBOARD GENERATED CODES

The CIT324's editing keypad, numeric keypad, and control and function keys can be used to generate a variety of control codes and escape sequences. The codes generated by these key groups vary according to the emulation mode (VT52, VT100, and VT300 7 Bit, or VT300 8 Bit) selected. Also, the codes generated by the numeric keypad depend upon the "Keypad : Applications" mode selection in the Keyboard Set-Up Menu. In the VT300 and VT100 emulation modes, the codes generated by the cursor keys vary according to the "Cursor Keys : Application" mode selection.

The keyboard generated codes are listed in the following table. Note that in the VT100 emulation mode, the F6 through F20 keys can be set to generate the same codes as they do in the VT300 7-Bit mode. For more information, refer to the Keyboard Enhancements Menu description in Chapter 4.

Table B-1. Keyboard Generated Codes

KEY	CODES GENERATED							
	VT300 8-BIT MODE		VT300 7-BIT MODE		VT100 MODE		VT52 MODE	
	Normal	Application	Normal	Application	Normal	Application	Normal	Application
CURSOR UP	CSI A	SS3 A	ESC [A	ESC O A	ESC [A	ESC O A	ESC A	ESC A
CURSOR DOWN	CSI B	SS3 B	ESC [B	ESC O B	ESC [B	ESC O B	ESC B	ESC B
CURSOR RIGHT	CSI C	SS3 C	ESC [C	ESC O C	ESC [C	ESC O C	ESC C	ESC C
CURSOR LEFT	CSI D	SS3 D	ESC [D	ESC O D	ESC [D	ESC O D	ESC D	ESC D
FIND	CSI 1 ~	CSI 1 ~	ESC [1 ~	ESC [1 ~				
INSERT HERE	CSI 2 ~	CSI 2 ~	ESC [2 ~	ESC [2 ~				
REMOVE	CSI 3 ~	CSI 3 ~	ESC [3 ~	ESC [2 ~				
SELECT	CSI 4 ~	CSI 4 ~	ESC [4 ~	ESC [3 ~				
PREV SCREEN	CSI 5 ~	CSI 5 ~	ESC [5 ~	ESC [5 ~				
NEXT SCREEN	CSI 6 ~	CSI 6 ~	ESC [6 ~	ESC [6 ~				
0	0	SS3 p	0	ESC O p	0	ESC O p	0	ESC ? p
1	1	SS3 q	1	ESC O q	1	ESC O q	1	ESC ? q
2	2	SS3 r	2	ESC O r	2	ESC O r	2	ESC ? r
3	3	SS3 s	3	ESC O s	3	ESC O s	3	ESC ? s
4	4	SS3 t	4	ESC O t	4	ESC O t	4	ESC ? t
5	5	SS3 u	5	ESC O u	5	ESC O u	5	ESC ? u

Table B-1. Keyboard Generated Codes (Continued)

KEY	CODES GENERATED							
	VT300 8-BIT MODE		VT300 7-BIT MODE		VT100 MODE		VT52 MODE	
	Normal	Application	Normal	Application	Normal	Application	Normal	Application
6	6	SS3 v	6	ESC O v	6	ESC O v	6	ESC ? v
7	7	SS3 w	7	ESC O w	7	ESC O w	7	ESC ? w
8	8	SS3 x	8	ESC O x	8	ESC O x	8	ESC ? x
9	9	SS3 y	9	ESC O y	9	ESC O y	9	ESC ? y
PF1	SS3 P	SS3 P	ESC O P	ESC O P	ESC O P	ESC O P	ESC P	ESC P
PF2	SS3 Q	SS3 Q	ESC O Q	ESC O Q	ESC O Q	ESC O Q	ESC Q	ESC Q
PF3	SS3 R	SS3 R	ESC O R	ESC O R	ESC O R	ESC O R	ESC R	ESC R
PF4	SS3 S	SS3 S	ESC O S	ESC O S	ESC O S	ESC O S	ESC S	ESC S
- (minus)	-	SS3 m	-	ESC O m	-	ESC O m	-	ESC ? m
, (comma)	,	SS3 l	,	ESC O l	,	ESC O l	,	ESC ? l
. (period)	.	SS3 n	.	ESC O n	.	ESC O n	.	ESC ? n
ENTER	CR or CR LF	SS3 M	CR or CR LF	ESC O M	CR or CR LF	ESC O m	CR or CR LF	ESC ? M
HOLD SCREEN								
PRINT SCREEN								
SET-UP								
F4								
BREAK								
F6	CSI 1 7 ~	CSI 1 7 ~	ESC[1 7 ~	ESC[1 7 ~				
F7	CSI 1 8 ~	CSI 1 8 ~	ESC[1 8 ~	ESC[1 8 ~				
F8	CSI 1 9 ~	CSI 1 9 ~	ESC[1 9 ~	ESC[1 9 ~				
F9	CSI 2 0 ~	CSI 2 0 ~	ESC[2 0 ~	ESC[2 0 ~				
F10	CSI 2 1 ~	CSI 2 1 ~	ESC[2 1 ~	ESC[2 1 ~				
F11 (ESC)	CSI 2 3 ~	CSI 2 3 ~	ESC[2 3 ~	ESC[2 3 ~	ESC	ESC	ESC	ESC
F12 (BS)	CSI 2 4 ~	CSI 2 4 ~	ESC[2 4 ~	ESC[2 4 ~	BS	BS	BS	BS
F13 (LF)	CSI 2 5 ~	CSI 2 5 ~	ESC[2 5 ~	ESC[2 5 ~	LF	LF	LF	LF
F14	CSI 2 6 ~	CSI 2 6 ~	ESC[2 6 ~	ESC[2 6 ~				
HELP (F15)	CSI 2 8 ~	CSI 2 8 ~	ESC[2 8 ~	ESC[2 8 ~				
DO (F16)	CSI 2 9 ~	CSI 2 9 ~	ESC[2 9 ~	ESC[2 9 ~				
F17	CSI 3 1 ~	CSI 3 1 ~	ESC[3 1 ~	ESC[3 1 ~				
F18	CSI 3 2 ~	CSI 3 2 ~	ESC[3 2 ~	ESC[3 2 ~				
F19	CSI 3 3 ~	CSI 3 3 ~	ESC[3 3 ~	ESC[3 3 ~				
F20	CSI 3 4 ~	CSI 3 4 ~	ESC[3 4 ~	ESC[3 4 ~				

APPENDIX C

CONTROL CODES

The following is a summary of the control codes used with the CIT324.

Table C-1. C0 Control Codes

C0 Code	Function	Hex Value	<CTRL> &	Dedicated Key
NUL	Null	00H	2 or SPACE	
ENQ	Enquiry	05H	E	
BEL	Bell	07H	G	
BS	Back Space	08H	H	Back Space
HT	Horizontal Tab	09H	I	Tab
LF	Line Feed	0AH	J	Line Feed
VT	Vertical Tab	0BH	K	
FF	Form Feed	0CH	L	
CR	Carriage Return	0DH	M	Return
SO	Shift Out	0EH	N	
SI	Shift In	0FH	O	
DC1	Device Control 1 (XON)	11H	Q	
DC3	Device Control 3 (XOFF)	13H	S	

Table C-1. C0 Control Codes (Cont.)

C0 Code	Function	Hex Value	<CTRL> &	Dedicated Key
CAN	Cancel	18H	X	
SUB	Substitute	1AH	Z	
ESC	Escape	1BH	3 or [	Escape
US	Unit Separator	1FH	7 or ?	
<X] (DEL)	Delete	7FH	8	<X]

Table C-2. C1 CONTROL CODES

C1 Code	Function	Hex Value	7-Bit Sequence
IND	Index	84H	ESC D
NEL	Next Line	85H	ESC E
HTS	Horizontal Tabulation Set	88H	ESC H
RI	Reverse Index	8DH	ESC M
SS2	Single Shift 2	8EH	ESC N
SS3	Single Shift 3	8FH	ESC O
DCS	Device Control String	90H	ESC P
CSI	Control Sequence Introducer	9B	ESC [
ST	String Terminator	9C	ESC \
OSC	Operating System Command	9D	ESC]
PM	Privacy Message	9E	ESC ^
APC	Application Program Command	9F	ESC _

APPENDIX D

CONTROL SEQUENCES

The following is a summary of the control sequences used with the CIT324.

SET EMULATION MODES

Set VT100 mode	CSI 61 " p
Set VT300 8-bit mode	CSI 62 " p
Set VT300 8-bit mode	CSI 62 ; 0 " p
Set VT300 8-bit mode	CSI 62 ; 2 " p
Set VT300 8-bit mode	CSI 63 " p
Set VT300 8-bit mode	CSI 63 ; 0 " p
Set VT300 8-bit mode	CSI 63 ; 2 " p
Set VT300 7-bit mode	CSI 62 ; 1 " p
Set VT300 7-bit mode (default)	CSI 63 ; 1 " p
Set VT52 mode	CSI ? 2 l

Set C1 Control Code Transmission

Send 7-bit control code (VT300 mode only)	ESC sp F
Send 8-bit control code (VT300 mode only)	ESC sp G

National Replacement Character Set Mode

National Mode (NRC) set	CSI ? 42 h
Multinational mode (DEC Supplemental /ISO Latin-1) set	CSI ? 42 l

CHARACTER SET DESIGNATION

Character Set	Designate as:	
ASCII	G0	ESC (B
	G1	ESC) B
	G2	ESC * B
	G3	ESC + B

Character Set	Designate as:	
DEC Supplemental	G0	ESC (% 5
	G1	ESC) % 5
	G2	ESC * % 5
	G3	ESC + % 5
User-Preferred	G0	ESC (<
	G1	ESC) <
	G2	ESC * <
	G3	ESC + <
DEC Special Graphic	G0	ESC (0
	G1	ESC) 0
	G2	ESC * 0
	G3	ESC + 0
Soft Character set	G0	ESC (name
	G1	ESC) name
	G2	ESC * name
	G3	ESC + name
NRC Sets		
British	G0	ESC (A
	G1	ESC) A
	G2	ESC * A
	G3	ESC + A
Dutch	G0	ESC (4
	G1	ESC) 4
	G2	ESC * 4
	G3	ESC + 4
Finnish	G0	ESC (5 or C
	G1	ESC) 5 or C
	G2	ESC * 5 or C
	G3	ESC + 5 or C
French	G0	ESC (R
	G1	ESC) R
	G2	ESC * R
	G3	ESC + R

Character Set	Designate as:	
French Canadian	G0	ESC (9 or Q
	G1	ESC) 9 or Q
	G2	ESC * 9 or Q
	G3	ESC + 9 or Q
German	G0	ESC (K
	G1	ESC) K
	G2	ESC * K
	G3	ESC + K
Italian	G0	ESC (Y
	G1	ESC) Y
	G2	ESC * Y
	G3	ESC + Y
Norwegian/Danish	G0	ESC (' or E or 6
	G1	ESC) ' or E or 6
	G2	ESC * ' or E or 6
	G3	ESC + ' or E or 6
Portuguese	G0	ESC (% 6
	G1	ESC) % 6
	G2	ESC * % 6
	G3	ESC + % 6
Spanish	G0	ESC (Z
	G1	ESC) Z
	G2	ESC * Z
	G3	ESC + Z
Swedish	G0	ESC (7 or H
	G1	ESC) 7 or H
	G2	ESC * 7 or H
	G3	ESC + 7 or H
Swiss	G0	ESC (=
	G1	ESC) =
	G2	ESC * =
	G3	ESC + =
ISO Latin-1	G0	ESC - A
	G1	ESC . A
	G2	ESC / A
Soft Character Set	G1	ESC - name
	G2	ESC . name
	G3	ESC / name

MAPPING CHARACTER SETS

Map G0 into GL (Default)	SI
Map G1 into GL	SO
Map G1 into GR	ESC ~
Map G2 into GL	ESC n
Map G2 into GR	ESC }
Map G3 into GL	ESC o
Map G3 into GR	ESC | (7/12)

Function (single shift control)	8-Bit character	7-Bit sequence
Map G2 into GL (single shift2)	SS2 (8EH)	or ESC N
Map G3 into GR (single shift3)	SS3 (8FH)	or ESC O

ASSIGN USER -PREFERRED SUPPLEMENTAL SET

Assigns DEC Supplemental Graphic Set	DCS 0 ! u % 5 ST
Assigns ISO Latin-1 Supplemental Set	DCS 1 ! u A ST

Announcing ANSI Conformance Levels

ANSI Conformance Level 1 — ESC sp L

- Designate ASCII Character Set into G0
- Designate ISO Latin-1 Supplemental Character Set into G1
- Map G0 into GL
- Map G1 into GR

ANSI Conformance Level 2 — ESC sp M
(Same as Level 1)

ANSI Conformance Level 3 — ESC sp N

- Designate ASCII Character Set into G0
- Map G0 into GL

Down-Line Loading Soft Character Set

DCS Pfn;Pcn;Pe;Pcmw;Pw;Pt;Pcmh;Pcss { Dscs Sxbp1;Sxbp2;....
;Sxbpn ST

DCS Pfn;Pcn;Pe;Pcms;Pw;Pt {<name> Sxbp1;Sxbp2;.....;Sxbpn ST

Clear Soft Character Set DCS 1;1;2 { sp @ ST

TERMINAL MODES

Controlling the Display Format

Column Mode

Set to 132 Column Mode	CSI ? 3 h
Reset to 80 Column Mode	CSI ? 3 l

Cursor Origin Mode

Set Cursor Origin Mode	CSI ? 6 h
Reset Cursor Origin Mode	CSI ? 6 l
Set Top and Bottom Margin	CSI Pt;Pbr

SELECT GRAPHIC RENDITION

Setting Visual Character Attribute

Select Graphic Rendition CSI Ps;....;Psm

Ps = 0 : All attributes off
1 : Bold
4 : Underline
5 : Blinking
7 : Reverse Video
8 : Invisible
22 : Bold off
24 : Underline off
25 : Blinking off
27 : Reverse Video off
28 : Invisible off

SETTING LINE ATTRIBUTE
(Width/Height Line Commands)

Double-width, double-height top half	ESC # 3
Double-width, double-height bottom half	ESC # 4
Single-width, Single-height (normal)	ESC # 5
Double-width, Single-height	ESC # 6
Single-width, double-height top half	ESC # :
Single-width, double-height bottom half	ESC # ;

CHARACTER INSERT/REPLACE MODE

Set Insert Mode	CSI 4 h
Reset Replace Mode	CSI 4 l

EDITING COMMANDS

Delete line	CSI Pn M
Insert line	CSI Pn L
Delete character	CSI Pn P
Insert character	CSI Pn @

ERASE CONTROL SEQUENCES

Set erase character — CSI Pn s
or CSI > Pn s

Erase character(s) — CSI Pn X

Selective Erase Attribute — CSI Ps " q

Ps = 0 : Attribute off (erasable)
1 : Non-erasable character (attribute on)
2 : Erasable character (attribute off)

Erase window — CSI > 3;rt;cl;rb;crJ

rt = top row
cl = left column
rb = bottom row
cr = right column

Erase Screen/Line : Attributes protected

```
Erase within screen                                    CSI ? Ps J

     Ps = 0 : Erase from cursor to end of screen
          1 : Erase from top of screen to cursor
          2 : Erase entire screen

Erase window line                                  CSI > 3;cl;cr K

     cl = left column
     cr = right column

Erase within line                                      CSI ? Ps K
                                                  or   CSI ? K

     Ps = 0 : Erase from cursor to end of line
          1 : Erase from start of line to cursor
          2 : Erase entire line

Erase Screen/Line : Attribute Unprotected

Erase within screen                                    CSI Ps J
                                                  or   CSI J
     Ps = 0 : Erase from cursor to end of screen
          1 : Erase from top of screen
          2 : Erase entire screen

Erase within line                                      CSI Ps K
                                                  or   CSI K

     Ps = 0 : Erase from cursor to end of line
          1 : Erase from start of line to cursor
          2 : Erase entire line
```

CURSOR SEQUENCES

```
Set Visible cursor                                     CSI ? 25 h
Set Invisible cursor                                   CSI ? 25 l

Set cursor position (Pl line, Pc column)           CSI Pl;Pc H
Set cursor position (Pl line, Pc column)           CSI Pl;Pc f

Move cursor Pn lines up                                CSI Pn A
Move cursor Pn lines down                              CSI Pn B
Move cursor Pn columns right (forward)                 CSI Pn C
Move cursor Pn columns left (backward)                 CSI Pn D
```

Move cursor down 1 line	ESC D
Move cursor up 1 line	ESC M
Move cursor to left margin of next line (new line)	ESC E

TABULATION

Set tab stop	ESC H
Clear tab stop at current column	CSI 0 g
Clear all tab stops	CSI 3 g

Keyboard Control Sequences

Lock the keyboard (Wait LED comes on)	CSI 2 h
Unlock the keyboard	CSI 2 l
Set new line for LF, FF or VT	CSI 20 h
Set line feed for LF, FF or VT	CSI 20 l
Set auto repeat mode	CSI ? 8 h
Set no repeat mode	CSI ? 8 l
Set auto wrap mode	CSI ? 7 h
Set no auto wrap mode	CSI ? 7 l
Application cursor keys	CSI ? 1 h
Normal cursor keys	CSI ? 1 l
Application keypad	ESC =
Numeric keypad	ESC >
Application keypad	CSI ? 66 h
Numeric keypad	CSI ? 66 l
Data processing key	CSI ? 68 h
Typewriter key	CSI ? 68 l

Programming UDKs

Programming UDKs (DEC-compatible method)	DCS Pc;P1 | Ky1/st1;...Kyn/Stn ST
Clear programmable keys	DCS 0;1 | ST
Lock programmable keys	DCS 1;0 | ST

Port Control Sequences

Set print extent mode	CSI ? 19 h
Reset print extent mode	CSI ? 19 l
Set print form feed mode	CSI ? 18 h
Reset print form feed mode	CSI ? 18 l
Auto print on	CSI ? 5 i
Auto print off	CSI ? 4 i
Enter auto auxiliary mode	ESC # 0
Exit auto auxiliary mode	ESC # 1
Printer controller on	CSI 5 i
Printer controller off	CSI 4 i
Enter auxiliary control mode	ESC 1
Exit auxiliary control mode	ESC 2
Print screen	CSI i or CSI 0 i
Output page to auxiliary	ESC # 7
Print cursor line	CSI ? 1 i
Output cursor line to auxiliary	ESC # 2
Limited transmit mode	CSI ? 73 h
Unlimited transmit mode	CSI ? 73 l
Keyboard to Comm mode	ESC [0 z
Keyboard to Aux mode	ESC [1 z
Aux to Comm mode	ESC [2 z
Aux to display mode	ESC [3 z
Cease input from Aux	ESC [4 z
Clear Aux output buffer	ESC [5 z
Enter auxiliary concurrent mode	ESC 0

Screen Display Control Sequences

Local echo off	CSI 12 h
Local echo on	CSI 12 l
Dark text, light screen mode	CSI ? 5 h
Light text, dark screen mode	CSI ? 5 l

```
Smooth scroll                                   CSI ? 4 h
Jump scroll                                     CSI ? 4 l

Select main display                             CSI 0 $ }
Select status line                              CSI 1 $ }

No status line                                  CSI 0 $ ~
Indicate status line                            CSI 1 $ ~
Host writable status line                       CSI 2 $ ~
Write data to status line
                          DCS Pn1;Pn2;....;Pnn Q <data> ST
```

Primary Devices Attributes

```
Request device attributes (Host to Term)    CSI c or CSI 0 c
Response device attribute (Term to Host)
                                      CSI ? Psc;Psl; ;Psn c

     Psc : 61  Level 1 (VT100 family)
           62  Level 2 (VT200 family)
           63  Level 3 (VT300 family)
     Psn :  1  132 column
            2  Print port
            6  Selective erase
            7  Soft character
            8  User defined key
            9  NRCS
           11  25th status line
           14  8 bit interface architecture
           17  Terminal state interrogation
```

Secondary Devices Attributes

```
Request secondary devices attributes (Host to Term)
                                        CSI > c or CSI > 0 c

Response secondary devices attributes (Term to Host)
                                        CSI ? Pp;Pv;Pc c

     Pp : ID code 24 = VT320 terminal
     Pv : firmware version
     Pc : hardware option  0 = no option
```

Device Status Report

```
Request   terminal status (Host to Term)            CSI 5 n
Response  terminal status (Term to Host) (OK)       CSI 0 n
Response  Terminal status (Term to Host) (NG)       CSI 3 n

Request cursor position (Host to Term)              CSI 6 n
Response cursor position (Term to Host)             CSI Pl;PcR

     Pl = line number
     Pc = column number

Request printer status (Host to Term)               CSI ? 15 n
Response no printer status (Term to Host)           CSI ? 13 n

Response printer ready status (Term to Host)        CSI ? 10 n
Response printer not ready status (Term to Host)    CSI ? 11 n
```

User Defined Keys

```
Request UDK status (Host to Term)                   CSI ? 25 n
Response UDK unlocked status (Term to Host)         CSI ? 20 n
Response UDK locked status (Term to Host)           CSI ? 21 n

Request keyboard language (Host to Term)            CSI ? 26 n
Response keyboard language (Term to Host)   CSI ? 27 ; Pla n

     Pla = 1 : North American
           2 : British
           3 : Flemish
           4 : Canadian (French)
           5 : Danish
           6 : Finnish
           7 : German
           8 : Dutch
           9 : Italian
          10 : Swiss (French)
          11 : Swiss (German)
          12 : Swedish
          13 : Norwegian
          14 : French (Belgian)
          15 : Spanish
          16 : Portuguese
```

Presentation State Report (VT300 mode only)

Request cursor report (Host to Term)	CSI 1 $ w
Response cursor report (Term to Host)	DCS 1 $ u D...D ST
Request tab stop report (Host to Term)	CSI 2 $ w
Response tab stop report (Term to Host)	DCS 2 $ u D...D ST
Restore cursor report	DCS 1 $ t D...D ST
Restore tab stop report	DCS 2 $ t D...D ST
Error request ignored	CSI 0 $ w
Error restore ignored	CSI 0 $ t

Mode Setting (VT300 mode only)

Request ANSI mode (Host to Term)	CSI Pa $p
Response ANSI mode (Term to Host)	CSI Pa ;Ps $y

Pa = 2 : Keyboard action
3 : Control representation
4 : Insert/replace
12 : Local echo
20 : New line / line feed

Ps = 0 : Unknown mode
1 : Set
2 : Reset
3 : Permanently set
4 : Permanently reset

Reporting DEC Private Mode

Request DEC private mode (Host to Term)	CSI ? Pa $p
Response DEC private mode (Term to Host)	CSI ? Pa ;Ps $y

Ps = 0 : Unknown mode
1 : Set
2 : Reset
3 : Permanently set
4 : Permanently reset

```
Pa =  1 : Cursor keys
      2 : ANSI/VT52
      3 : 80/132 column
      4 : Scrolling
      5 : Screen
      6 : Origin
      7 : Autowrap
      8 : Auto report
     18 : Print form feed
     19 : Print extent
     25 : Text cursor enable
     42 : NRCS
     66 : Numeric keypad
     68 : Keyboard usage
     73 : Transmit rate limiting
```

Other Control Function Setting (VT300 mode only)

Request selection or setting (Host to Term)

DCS $q D...D ST

```
D....D = $} select active status display
         "q set character attribute
         "p set conformance level
         $~ set status line type
         r  set top and bottom margins
         m  select graphic rendition
```

Report selection or setting (Term to Host)

DCS Ps $r D..D ST

```
Ps   =  0  Host's request is valid
        1  Host's request is invalid
```

D....D = indicate the current setting of feature

Saving and Restoring the Cursor Status

Save cursor ESC 7

- Cursor position
- Visual character attributes
- Character sets in GL and GR
- Autowrap setting
- Origin mode setting
- Selective erase attribute
- Any single shift 2 or 3 sent

Restore cursor ESC 8

- Move cursor to home position
- Reset origin mode
- Turns all visual characters
- Turns selective erase attribute off
- Maps ASCII set into GL and DEC Supplemental Graphic into GR

User-Prefered Supplemental set report (VT300 mode only)

Request User-preferred supplemental set (Host to Term)
CSI & u

Response DEC Supplemental Graphic set (Term to Host)
DCS 0 ! u % 5 ST

Response ISO Latin-1 Supplemental set (Term to Host)
DCS 1 ! u A ST

Terminal Parameter Reports

Request terminal parameters (unsolicited report)
(Host to Term) CSI 0 x or CSI x

Request terminal parameters (requested report)
(Host to Term) CSI 1 x

Response terminal parameters (Term to Host)
CSI <sol> ;Par;nbits;xspeed;rspeed;clkmul;flagx

```
sol    = 2 : Unsolicited report
         3 : Requested report
par    = 1 : Non
         2 : Odd
         3 : Even
nbits = 1 : 8 bit long
         2 : 7 bit long
xspeed/rspeed =  8 :    75 bps
                16 :   110 bps
                32 :   150 bps
                48 :   300 bps
                56 :   600 bps
                64 :  1200 bps
                88 :  2400 bps
               104 :  4800 bps
               112 :  9600 bps
               120 : 19200 bps
```

clkmu = 1 : Bit rate multiplier is 16
flag = 0000 ~ 1111 : Parameter report flag

Resetting Terminal

Soft terminal reset	CSI ! p
Hard terminal reset	ESC c

Alignment

Fill screen with E's	ESC # 8
Fill screen with character assortment	ESC # 9

Diagnostic (Self-Test)

Self-test Diagnostics CSI 4;Ps;Ps;...y

Ps = 0 : All tests (1, 2, 3, 6)
1 : Power-up self-test
2 : RS232 port data lines loop back test (Comm port)
3 : Aux port loop back test
6 : EIA port modem control lines loop back test
7 : RS423 port loop back test
9 : Repeats the tests in the string

VT52 MODE ESCAPE SEQUENCES

VT100 Mode

Exit VT52 mode (Enter VT100 mode)	ESC <

Cursor Control Sequences

Move Cursor up	ESC A
Move Cursor down	ESC B
Move Cursor right	ESC C
Move Cursor left	ESC D
Move cursor home	ESC H
Position Cursor	ESC Yrc

Graphics Mode

Enter Special Graphics Mode	ESC F
Exit Special Graphic Mode	ESC G

Scroll

Reverse Line Feed	ESC I

Erase Control Sequences

Erase to End of Page	ESC J
Erase to End of Line	ESC K

Request Identity

Identify Terminal Type (Host to Term)	ESC Z
Report Terminal Type (Term to Host)	ESC/Z

Keypad Application Mode

Enter Alternate Keypad Mode	ESC =
Exit Alternate Keypad Mode	ESC >

Bidirectional Auxiliary Port Control

Enter Concurrent Auxiliary Mode	ESC U
Output Cursor Line to Printer	ESC V
Enter Printer Controller Mode	ESC W
Exit Printer Controller Mode	ESC X
Output Full Screen to Printer	ESC]
Enter Auto Print Mode	ESC ^
Exit Auto Print Mode	ESC _

APPENDIX E

INTERFACING

In the standard system configuration the CIT324 is interfaced with the host via the bidirectional communication port, according to EIA RS-232C, RS-423 or 20 mA current loop conventions. The terminal also provides a bidirectional auxiliary port. This port is RS-232C, RS-423 or current loop compatible and is designed to support a variety of peripheral devices.

The CIT324 will work with modems with standard EIA RS-232C and RS-423 interfaces and is in accordance with national and international standards and recommendations. The modems at the terminal end and the host computer end must be compatible with each other.

The male 25 Pin or 6 Pin MMJ connector, labelled COMM, is used for the host communication. The female 25 Pin or 6 Pin MMJ connector, labelled AUX, is used for the peripheral device communication.

The following tables provide the pin assignments for the ports.

Communication parameters, (e.g. baud rates, parity, etc.) are selected in the set-up mode.

Table E-1. COMM Connector Pin Assignments

PIN	SIGNAL NAME		NOTES
1	AA	Signal Ground (SGND)	Chassis and reference ground
2	BA	Transmit Data (TXD)	Transmits serial data from the terminal
3	BB	Receive Data (RXD)	Receives serial data into the terminal
4	CA	Request to Send (RTS)	Asks the host to transmit.
5	CB	Clear to Send (CTS)	Tells the terminal that the host is ready to transmit.

Table E-1. COMM Connector Pin Assignments (Cont.)

PIN	SIGNAL NAME		NOTES
6	CC	Data Set Ready (DSR)	Tells the terminal the host is in the data mode and is ready to exchange RTS, CTS and CD.
7	AB	Signal Ground (SGND)	Chassis and reference ground
8	CF	Carrier Detect (CD)	Tells the terminal that the signal received on the communication line is of adequate quality to ensure proper demodulation of data. If off, indicates no signal received or signal not suited for demodulation.
12	CI	Speed Indicator (SPDI)	To terminal. When on, enables a modem to control the terminal's transmit and receive speeds. Sets the speed to 1200 bits per second regardless of set-up selection.
20	CD	Data Terminal Ready (DTR)	Tells the host that the terminal is ready to transmit or receive.
23	CH	Speed Select (SPDS)	From terminal. Tells modem that the receive speed selected in set-up is greater than 600 bits per second.

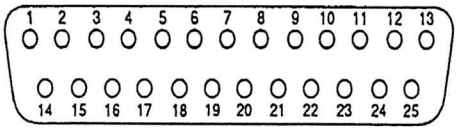

Figure E-1. COMM Connector Pin Locations

Table E-2. COMM and AUX MMJ Connector Pin Assignments

PIN	SIGNAL NAME	NOTES
1	Data Terminal Ready (DTR)	Tells the modem or printer that the CIT324 is ready to send or receive.
2	Transmitted Data (TXD)	Transmits serial data from the terminal.
3	Transmit Signal Ground (TXDRTN)	Provides the common ground reference potential for transmitted signals TXD+ and DTR.
4	Receive Signal Ground (RXDRTN)	Provides the common ground reference potential for received signals RXD+ and DSR.
5	Received Data (RXD)	Receives serial data into the terminal.
6	Data Set Ready (DSR)	Tells the CIT324 that the modem is in the data mode and is ready to communicate.

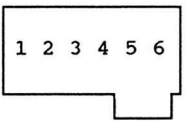

Figure E-2. MMJ Connector Pin Locations

Table E-3. AUX Connector Pin Assignments

PIN	SIGNAL NAME		NOTES
1	AAA	Protective ground (PGND)	Chassis ground.
2	ABA	Receive Data (RXD)	Receives serial data into the terminal.
3	ABB	Transmitted Data (TXD)	Transmits serial data from the terminal.
6	ACC	Data Terminal Ready (DTR)	Tells the modem or printer that the CIT324 is ready to send or receive.
7	AAB	Signal Ground (SGND)	Chassis and reference ground.
20*	ACD	Clear to Send (CTS)	Tells the terminal it is okay to send data to the peripheral.

* If the printer does not send this signal, pin 20 may be pulled high by jumpering to pin 21 at the terminal connector.

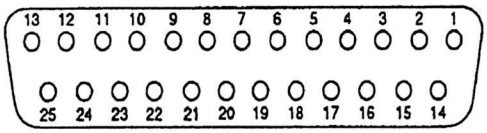

Figure E-3. AUX Connector Pin Locations

20 mA CURRENT LOOP

The terminal offers a 20 mA current loop interface as a standard feature. The interface may only be used on one of the two ports at one time. No modifications are required to use the 20 mA current loop since it is implemented via normally unused pins in the two port connectors.

External jumpering, as illustrated in Figures E-4 and E-5, is used to establish the desired current loop configuration. The pins used on the connector are listed below in Tables E-4 and E-5.

The current loop has two selectable modes of operation, either active or passive. In the active configuration the terminal is the current source; while in the passive configuration the terminal is the current sink. Selection of either mode requiring external jumpering within the connector.

In the passive mode, the XTMR line is optically isolated and goes to a MARK condition when off. In the active mode the XTMR is not optically isolated and goes to a SPACE condition.

Table E-4. COMM Port Current Loop Pin Assignments

Pin	Function	Notes
7	Signal Ground	Reference/Chassis ground
9	Current Loop Receive+	Tied to AUX pin 9
10	Current Loop Receive-	Tied to AUX pin 10
13	Receive Loop Bias	Tied to AUX pin 13
14	Current Loop to EIA in	Tied to AUX pin 14
16	EIA to Current Loop in	Tied to AUX pin 16
21	Transmit Loop Bias	Tied to AUX pin 21
24	Current Loop Transmit+	Tied to AUX pin 24
25	Current Loop Transmit-	Tied to AUX pin 25

Table E-5. AUX Port Current Loop Pin Assignments

Pin	Function	Notes
7	Signal Ground	Reference/Chassis ground
9	Current Loop Receive+	Tied to COMM pin 9
10	Current Loop Receive-	Tied to COMM pin 10
13	Receive Loop Bias	Tied to COMM pin 13
14	Current Loop to EIA in	Tied to COMM pin 14
16	EIA to Current Loop in	Tied to COMM pin 16
21	Transmit Loop Bias	Tied to COMM pin 21
24	Current Loop Transmit+	Tied to COMM pin 24
25	Current Loop Transmit-	Tied to COMM pin 25

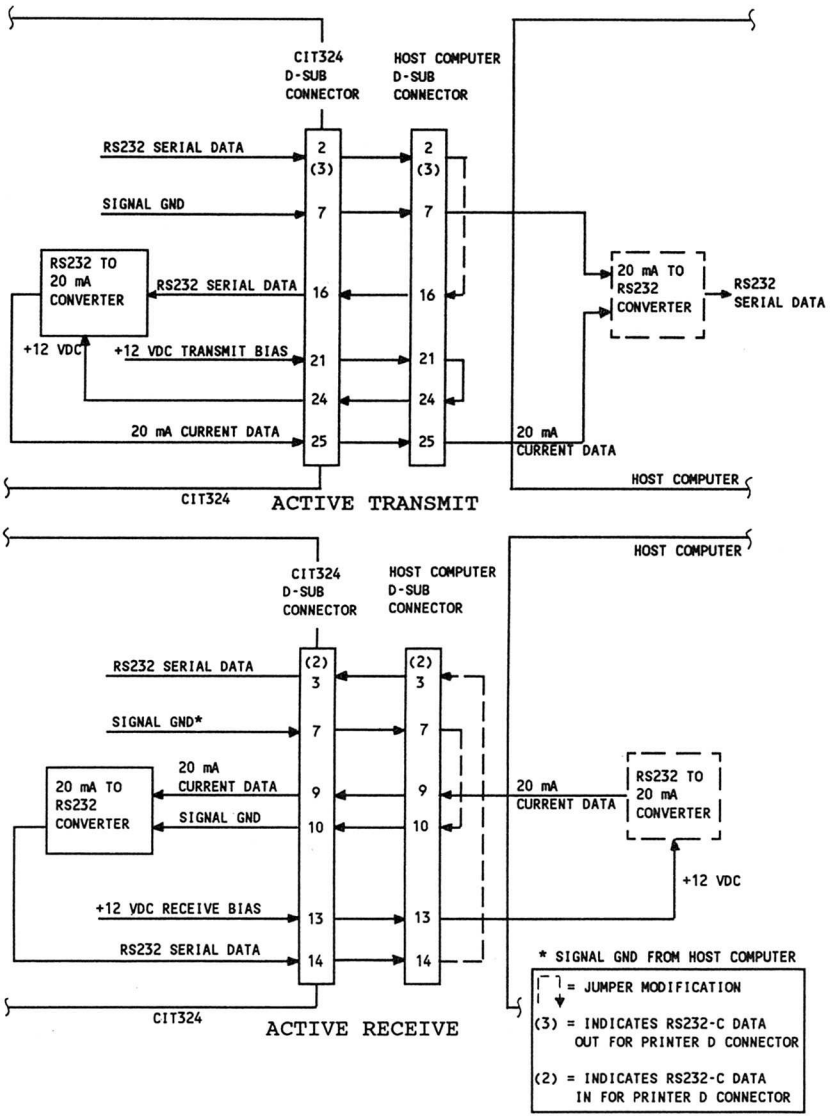

Figure E-4. 20 mA Current Loop
Active Configuration

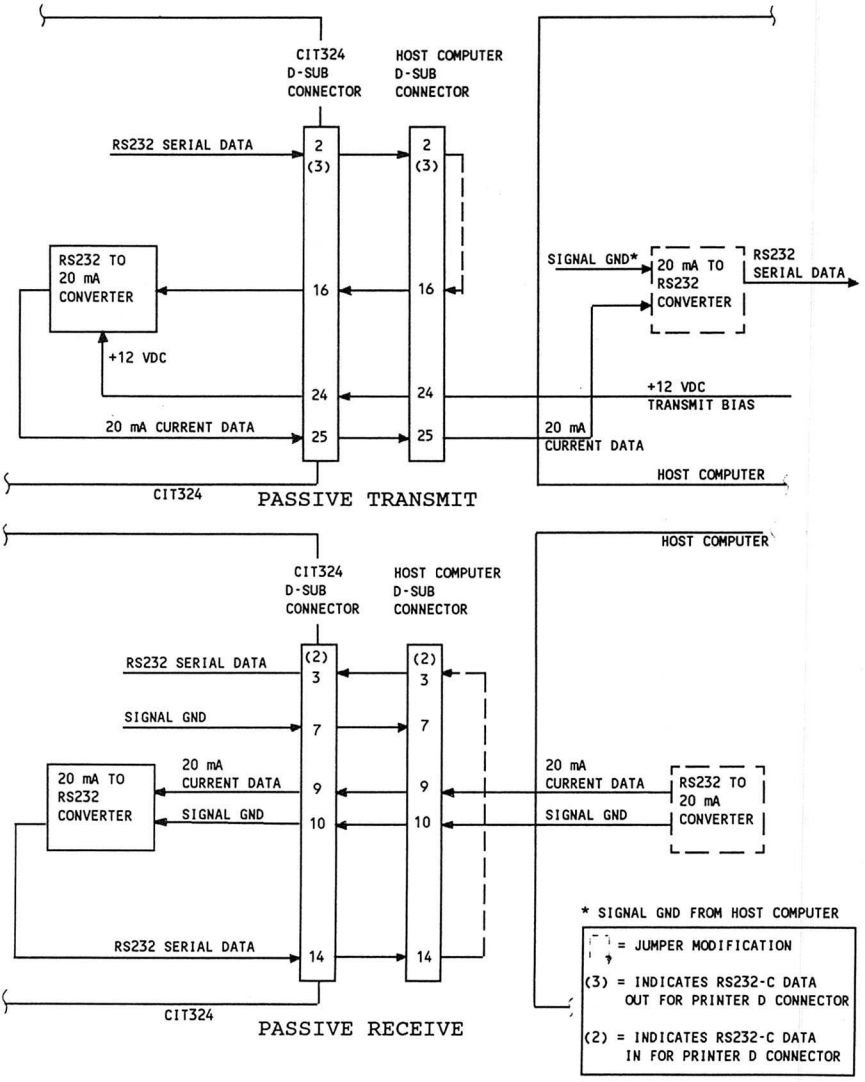

Figure E-5. 20 mA Current Loop
Passive Configuration

COMMUNICATIONS PORT PROTOCOL

The CIT324 terminal utilizes XON/XOFF handshake protocols for control of data flow. The following describes the communications XON/XOFF handshake controls.

Incoming characters are stored by the terminal in a receiver buffer manager that transmits XON/XOFF protocol. The manager processes the characters on a first-in/first-out basis. It does so on the appropriate transitions of the receiver buffer minimum and maximum thresholds determined by the terminal's logic. When the receiver buffer fills to the maximum number of characters (or 70% of the buffer), the terminal transmits an XOFF character to inhibit the host computer from sending more data.

An XON is asserted to resume communications when the data in the receiver buffer falls below 20% of the buffer space. Additional conditions that transmit XON are:

- A Clear COMM function
- A Recall function
- Completion of the self-test
- Pressing the HOLD SCREEN key to "free" the screen when the receiver buffer is at or below the XON print.

NOTE

If XOFF is disabled in set-up, the receiver buffer manager is inactive and does not transmit an XOFF character to the host computer. The keyboard HOLD SCREEN key is inactive also. There is no way to ensure that characters will not be lost.

The receiver buffer continues to fill with characters if XOFF is disabled. Any characters received after the buffer has filled up are lost. Reverse question marks appear on the screen replacing the lost characters.

Unrecognized XON/XOFF Characters

Software packages that do not recognize XON/XOFF characters sent from the terminal may access the terminal's features in the following ways:

- through the use of fill characters, or

by limiting the send/receive rate to 9600 baud and avoiding the use of an escape code, slow scrolling, the printer port, and the split screen.

Modem Connect/Disconnect

A modem may be used to connect the terminal to the host computer. When connected, all buffers, transmissions in progress, and XOFF's are cleared by the terminal, and the keyboard is unlocked if it is in the locked condition.

To disconnect the communications line, press the SHIFT BREAK keys.

Other actions that cause a disconnect between the host computer and the terminal are:

- Executing a Recall or Save operation in the set-up mode
- The loss of a Data Set Ready (DSR) signal
- The loss of a carrier detect signal for 2 seconds (or 60 ms) as determined in the Communications Set-Up Menu
- Lack of a carrier detect signal within 30 seconds after a DSR
- The host sends a self-test directive to the terminal
- Changing from the EIA port to the 20 mA port, or vice versa

PRINTER PORT PROTOCOL

The CIT324 receives XON/XOFF signals from the printer, but does not send them to it. When the printer buffer becomes full, it transmits an XOFF to the terminal to temporarily halt transmission of data characters. As the buffer empties, the printer sends an XON to the terminal to resume transmission of data.

Selecting Clear Comms Buffer in the Main Set-Up Menu also clears the buffer and sends an XON to the terminal.

NOTE

If an older printer is being used, it may not acknowledge 8-bit control codes. It is advisable to set the printer port to 7-bit operation through the Auxiliary Set-Up Menu.

APPENDIX F

SPECIFICATIONS

Physical dimensions, environmental requirements, and certain functional characteristics of the CIT324 terminal are contained in this listing.

Display

CRT	14-inch diagonal, non-glare, choice of B4 (L3) paper white, P31 green, or PLA amber phosphor, 43 MHz dot frequency using a 29 KHz non-interlace.
Active Display	Approximately 230 (H) x 170 (V) mm (9.0 x 7.7 inch) in case of 80 char. x 24 lines
Format	Light on dark or reverse 24 lines x 80/132 char. (selectable) status line on 25th line
Character Matrix	12 x 14 dot matrix including 4 descenders (80 char.) 8 x 14 dot matrix including 4 descenders (132 char.)
Character Cell	15 x 16 dot matrix (80 char., 24 rows) 9 x 16 dot matrix (132 char., 24 rows) 15 x 15 dot matrix (80 char., 24 + 1 rows) 9 x 15 dot matrix (132 char., 24 + 1 rows)
Cursor Types	Block, underline or invisible
Cursor Attributes	Blinking or non-blinking
Video Attributes	Normal, reverse, blinking, underline, bold or any combination Double width, double height lines

Scrolling	Jump, variable speed smooth scroll
Character Sets	ASCII, National Replacement Character Sets (NRCS), DEC Special Graphics, DEC Supplemental Character Set, ISO Latin Character Set, User Definable Character Set
Structure	Tilt 12 ° (up) or 6 ° (down), swivel 30 ° left or right from center

Keyboard

General	Low-profile, DIN-standard detachable keyboard with three-position tilt adjustment and a 1.8 m (6 ft.) coiled cord
Key Layout	108 keys: 80-key main pad, 18-key auxiliary keypad, 6-key editing pad and 4-key cursor control pad
Key Caps	Sculptured key caps with matted textured finish
Auxiliary Keypad	18-key numeric pad
Visual Indicators	Six LEDs: HOLD SCREEN, WAIT, COMPOSE, ON LINE, SHIFT LOCK and CAPS LOCK
Audible Indicators	Keyclick and Bell

Communication

Type	Full-duplex asynchronous with selectable local echo and full or half-duplex modem control
Interface	EIA RS232C, RS423 (MMJ), or 20 mA current loop
Speeds	75, 110, 150, 300, 600, 1200, 2400, 9600, 19200 baud (Transmit/Receive speeds can be set separately.)

Word Length	7 or 8 bits with 1 or 2 stop bits
Parity	Even, odd or none, mark or space (7 bit only)
Handshake Protocols	XON and XOFF control codes or DTS/DTR control
Control Codes	ASCII, ANSI X3.64-1979, DEC VT320, VT220, VT102, VT100 and VT52 compatible

Auxiliary Port

Type	Full-duplex asynchronous
Interface	EIA RS232C, RS423 (MMJ)
Speeds	75, 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200 baud
Word Length	7 or 8 bits with 1 or 2 stop bits
Parity	Even, odd or none, mark or space (7 bit only)
Handshake Protocols	XON and XOFF control codes or DTS/DTR control

Dimensions

Monitor	Height : 33.0 cm (13.00 inches) Width : 32.4 cm (12.75 inches) Depth : 35.0 cm (13.50 inches)
Keyboard	Height: 3.5 cm (1.38 inches) Width : 53.3 cm (21.00 inches) Depth : 17.4 cm (6.87 inches) Tilt : 20 ° max.

Weight

Monitor	9.2 kg (20.3 lb.)
Keyboard	1.8 kg (4.0 lb.)
Shipping Weight	Terminal: 11.8 kg (26.1 lb.) Keyboard: 2.6 kg (5.7 lb.)

Environment

Operating	Temperature: 10 to 40 ° C (50 to 105 ° F)
	Relative humidity: 10 to 90% (non-condensing)
	Altitude: Not to exceed 2.5 Km (8200 ft.)
Non-Operating	Temperature: -40 to 66 ° C (-40 to 150 ° F)
	Relative humidity: 20 to 95% (non-condensing)
	Altitude: Not to exceed 9.1 Km (30,000 ft.)

Power

Line Voltage	90-135 VAC single phase, 3 wire (factory option)
	180-270 VAC single phase, 3 wire (standard)
Line Frequency	47 - 63 Hz
AC Input Current	1.1 amps max. @ 90 - 135 VAC 0.7 amps max. @ 180 - 270 VAC
Input Power	50 watts
Power Cord	Detachable, 3 conductor, 2m

Standard and Optional Power Cords

See Table F-1 for a list of international power cord approval markings.

- Standard -	
EUROPE	Plug is rated at 240V, 10.16A. Plug and power cord comply with the CEE (7), II, IV, VII, IEC 83, and IEC 127 standards. Power cord type: "<HAR>" or UL Listed Type SVT No. 18/3AWG 300V, 10A.
- Optional -	
UK	Plug is rated at 240V, 6A. Plug and power cord comply with the 82 1363, IEC 83 1363, IEC 83, and IEC 127 standards. Power cord type: "<HAR>" or UL Listed Type SVT No. 18/3AWG 300V, 10A.
Australia	Plug is rated at 240V, 10A. Power cord and plug comply with the AS C112 and IEC 127 standards. Power cord type: "<HAR>" or UL Listed Type SVT No. 18/3AWG 300 V, 10A.
North American (220V-240V)	Plug is rated at 240V, 15A. Power cord and plug comply with the ANSI C73.20, NEMA 6-15-P, IEC 83, and UL 198.6 standards. Power cord is UL Listed Type SVT No. 18/3AWG 300V, 10A.
Swiss	Plug is rated at 220V, 6A. Power cord and plug comply with the SEV and IEC 127 standards. Power cord type: "<HAR>" or UL Listed Type SVT No. 18/3AWG 300V, 10A.
North American (100V-120V)	Plug is rated at 125V, 10A. Plug and power cord comply with the ANSI C73.11, NEMA 5-15-P, and IEC 83. Power cord type: UL Listed Type SVT or SJT No. 18 or 16/3AWG or "<HAR>" 300V, 10A or 13A.

Approval Organization	Approval Marking	Alternative Approval Marking Using black-red-yellow thread (length of color sections)
Belgium: Comite Electro-technique Belge (CEBEC)	CEBEC ◁ HAR ▷	10mm black 30mm red 10mm yellow
Verband Deutscher Elektro-techniker (VDE) e.V., Prufstelle	◁ VDE ▷ ◁ HAR ▷	30mm black 10mm red 10mm yellow
Technique de l'Electricite (UTE)	◁ UTE ▷ ◁ HAR ▷	30mm black 30mm red 10mm yellow
Instituto del Marchio Qualita (IMQ)	IEMMEQU ◁ HAR ▷	10mm black 30mm red 50mm yellow
British Approvals Service for Electric Cables (BASEC)	BASEC ◁ HAR ▷	10mm black 10mm red 30mm yellow
N.V. tot Keuring van Elektro-technishe Materialen (KEMA)	KEMA-KEUR ◁ HAR ▷	10mm black 30mm red 30mm yellow
Svenska Elektrisks Material-kontrollanstalter (SEMKO)	SEMKO ◁ HAR ▷	10mm black 10mm red 50mm yellow
Österreichnischer Verband für Elektrotechnik (ÖVE)	◁ OVE ▷ ◁ HAR ▷	30mm black 10mm red 50mm yellow
Danmarks Electricke Materiel-kontroll (DEMKO)	◁ DEMKO ▷ ◁ HAR ▷	30mm black 10mm red 30mm yellow
Institute for Industrial Research and Standards (IIRS)	◁ IIRS ▷ ◁ HAR ▷	30mm black 30mm red 50mm yellow
Norges Elektriske Materiel-kontroll (NEMKO)	NEMKO ◁ HAR ▷	10mm black 10mm red 70mm yellow

Table F-1. International Power Cord Approval Markings

Changing Voltage Setting

The CIT324 is set to operate on 220-240V at the factory. Follow procedure mentioned below when you change the voltage setting to 100-120V.

1. Remove four screws at the rear of the front flange and a screw located at the rear of the top cover, then put the top cover off.
2. You will see a male connector with yellow and white cables connected at the rear of the chassis (See Figure F-1). Put a female connector onto the male connector as shown in Figure F-2. The female connector has a cable shorted.
3. Please make sure that the voltage of the AC outlet is 100-120V before you plug the cord into it.

Male Connector

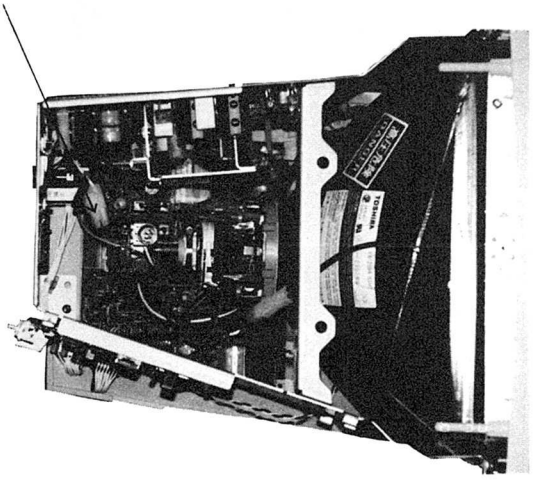

Figure F-1. Top View of Monitor Chassis
(1 of 2)

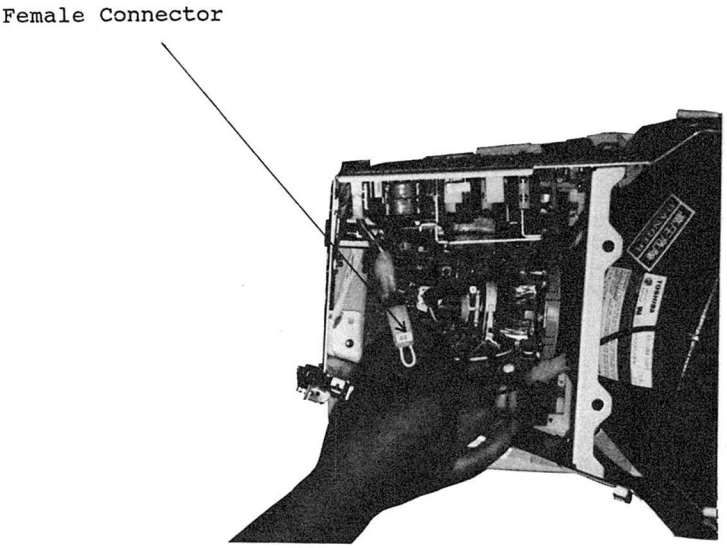

Figure F-2. Top View of Monitor Chassis
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